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DIRECTORATE OF DISTANCE EDUCATION

M.A (CHILD CARE AND EDUCATION)

III-SEMESTER

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RESEARCH IN CHILD STUDIES

Author
Mr. G. P. Raja
Assistant Professor
Department of Education
Directorate of Distance Education
Alagappa University
Karaikudi.

SYLLABI-BOOK MAPPING TABLE
RESEARCH IN CHILD STUDIES

CONTENTS

UNIT-I CONCEPT OF RESEARCH

Structure

1.1 INTRODUCTION

Research itself is an important activity of human beings. Any significant research can lead to progress in some or other fields of life. From the very creation of human habitation on the earth man is curious to know more and more. The mysteries of nature could not be left back. He attempted his best to make those mysteries into notice. He wanted to establish truths by applying his cause and effect method. Advancement is the sole nature of human activity. Hence he developed his time in education to make his research progressive. At this age of science and technology, thanks to the advancement in the domain of education, each year new products, new facts, new concepts, innovative way of doing things have come into our daily walk of lives.

This unit throws light on concept of research, importance of research, characteristics of research and significance of research.

1.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of research
- Define the term research
- Understand the importance of research
- List out the characteristics of research
- Understand the significance of research.

1.3 CONCEPT OF RESEARCH

The term research can be divided as Re + Search. That is search after search and search. The purpose of such repeated search is to thoroughly understand the problem or issue or phenomenon and find the

apt and effective solution to the problem or strategy to deal with the issue or the phenomenon. Such solution or strategy adds to our stock of knowledge in dealing with the problem or the issue.

In common Parlance, research refers to a search for knowledge. Research, simply put, is an endeavour to discover answers to problems (intellectual and practical) through the application of scientific method.

Research means to carefully analyze the problems or to do the detailed study of the specific problems, by making use of special scientific methods.

According to Albert Szent-Gyorgyi, “Research is to see what everybody else has seen, and to think what nobody else has thought.”

The Webster’s International Dictionary gives a very inclusive definition of research as “a careful, critical inquiry or examination in seeking facts or principles, diligent investigation in order to ascertain something”. The 20th Century Chambers dictionary defines research as: a careful search or systematic investigation towards increasing the sum of knowledge.

The term ‘Research’ refers to a critical, careful and exhaustive investigation or inquiry or experimentation or examination having as its aim the revision of accepted conclusions, in the light of newly discovered facts.

Francis G. Cornell defines research as, "the activity of collecting information in an orderly and systematic fashion".

D. Slesinger and D.Stephenson in the Encyclopedia of Social Sciences define research as “the manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art”.

John W.Best defines Research, “as the systematic and objective analysis and recording of controlled observations that may lead to the developments of generalizations, principles, or theories, resulting in prediction and possibly ultimate control of events”.

Research is thus the process of a systematic and in-depth study or search of any particular topic, subject or area of investigation, involving collection, compilation, presentation and interpretation of relevant details or data. It is a careful search or inquiry into any subject matter, which is an endeavour to discover to find out valuable facts which would be useful for solving problems or improving existing solutions to problems. The research that involves scientific analysis would result in the formulation of new theories, the discovery of new techniques, modification of old concepts or a knocking-off an existing theory, concept or technique.

Research is a systematic attempt to obtain answers to meaningful questions about phenomena or events through the application of scientific procedures. It is an objective, impartial, empirical and logical analysis and

recording of controlled observations that may lead to the development of generalizations, principles or theories, resulting, to some extent in prediction and control of events that may be consequences or causes of specific phenomena. Research is scientific, and as such, is not satisfied with isolated facts, but seeks to integrate and systematize its findings. It is concerned with the objective verification of generalizations. Such verification requires logical analyses of problems and devising of appropriate methodologies for obtaining evidence.

Need and Purpose for Research in Education

Research in education as in the other fields is essential for providing useful and dependable knowledge through which the process of education can be made more effective. There are various considerations, which emphasize need for research in education.

1. Education has strong roots in the fields like philosophy, history, economics, psychology, and sociology. It is, however, based on a conceptual frame of theory. It is through an intensive process of scientific enquiry about the philosophical, historical, economic, psychological, and sociological impact on various aspects of education that sound theories can be established.
2. Education is considered as much a science as an art. As a science, it has a corpus of knowledge concealing the nature of human mind, its growth and development; theories of administration and supervision; educational programme and practices prevalent in different countries and their results. The quantum of knowledge is indicated by the courses in education prescribed by various organizations and institutions for earning degrees in this field and also by the research material, which is being produced and continuously reported in different educational research journals. Since education depends on a corpus of knowledge, there is need to add scientific knowledge to it for enrichment and improvement. This will facilitate making adjustments in educational programmes accordingly. As an art, education seeks to impart knowledge effectively. For example, "How the teacher can play an effective role in the classroom and outside?" is a vital question before educationists, and needs careful research efforts to enhance teacher's effectiveness.
3. The slogan of democratization of education since 1870 resulted in the expansion of education. It has given rise to numerous problems like the problems of individual differences, expansion, buildings, discipline and so on. Solutions of such problems by trial and error or by experience from tradition and authority often yielded erroneous results. Moreover, growth by experience is very slow and accidental. We need solutions based on research so that the coming generation is not left to the mercy of errors of outright sins of tradition, ignorance and prejudice.
4. There is need for educational research because of the changing conception of education. The International Commission on the

Development of Education in its report "Learning to Be," (UNESCO, 1972, p. 143) emphasizes:

Education from now on can no longer be defined in relation to a fixed content which has to be assimilated, but must be conceived of as a process in the human being, who thereby learns to express himself, to communicate and to question the world, through his various experiences, and increasingly all the time to fulfil himself. It has strong roots, not only in economics and but also in findings from psychological research, which indicate that man is an unfinished being and can only fulfil himself by constant learning. If this is so, then education takes place at all ages of life, in all situations and circumstances of existence. It returns to its true nature, which is to be total and lifelong, and transcends the limits of institutions, programmes and methods imposed on it down the centuries.

In the context of the above nature of education, the limits of educational research have to be extended from the formal and conventional modes of education to the non-formal and innovative systems based on ecological and cybernetic models.

5. During the last two decades, great changes have taken place as a result of the rapid scientific and technological developments. Education has to play an important role so that we can accept the change in a smooth way.

1.4 IMPORTANCE OF RESEARCH

Creswell (2002) suggests the following reasons for which research is important:

1. Improved practice: Research can suggest ways of improving practice that have been verified with many applications and by many different types of people, which is difficult for practitioners.

2. Add to knowledge: Research can add to what we know about how people learn and what we can do help facilitate the learning process.

3. Address gaps in knowledge: Research can address areas in which little is known.

4. Expand knowledge: Research can allow us to extend what we know in ways we never conceived.

5. Replicate knowledge: Research can act as attest to verify previous findings.

6. Add voices of individuals to knowledge: Research can add an important perspective for different learning types. Much of the educational research prior to the 1980's is based on able, white, middle to upper class males. This is certainly not reflective of our increasingly heterogeneous students and research helps revise theory and practice to reflect different student needs.

1.5 CHARACTERISTICS OF RESEARCH

Research is characterized by objectivity, precision, verification, offering parsimonious explanation, generalizability, and replicability. Objectivity refers to scientific nature of the injury process which is free from personal bias of the researcher. Research in behavioral sciences differs from that in pure sciences because there is no 'zero point' in the assessment instrument. Further, the assessment can be only approximate and not absolute because behavior though consistent is a variable unlike the constants we come across in pure sciences. Hence precision, the next characteristic of research refers to the quantitative expression of the variable researched (like ability to move socially, the degree of attachment of the child with the care-giver, etc.) which take the form of a score in a measuring instrument. The qualitative aspect of human behavior is quantified by operational definition and approximation to reality with carefully designed instruments of assessment.

The next characteristic of research is that it offers simple explanations to complex events observed. This parsimonious explanation reduces the complexity of reality, thus making it possible for the common man to understand the phenomena with less effort.

Verification is another nature of research; in fact, most of the researches carried on human behavior are of verification type only. The principles, generalizations, theories arrived at based on research under controlled conditions (like laboratory or classroom) are tested and formed to be true and workable in empirical conditions.

Generalizability enables us to apply the findings of research carried on with a specific sample to the larger population. Thus, it was possible for Jean Piaget, the child psychologist who did a lot of research in the cognitive development of children, to generalize his findings based on his interactions with four children. Only when there is wider application, research has social and economic value.

Replicability refers to the ability of a research being repeated by other researchers. Only when the research is scientific, the conditions of research are clearly explained, replicability will be possible. This will endorse the findings of earlier researches.

Best and Kahn (1992,pp.18-20) have summarized the main characteristics of research as under:

1. Research is directed towards the solution of a problem. It may attempt to answer a question or to determine the relation between two or more variables.
2. Research emphasizes the development of generalizations, principles, or theories that will be helpful in predicting future occurrences. Research usually goes beyond the specific objects, groups or situations investigated and infers characteristics of a target population from the sample observed. Research is more than information retrieval, the sample gathering of information. Although many school research departments gather and tabulate

statistical information that may be useful in decision-making, these activities are not properly termed research.

3. Research is based upon observable experience or empirical evidence. Certain interesting questions do not lend themselves to research procedures because they cannot be observed. Research rejects revelation and dogma as methods of establishing knowledge and accepts only what can be verified by observation.
4. Research demands accurate observation and description. The researcher uses quantitative, numerical measuring devices, the most precise means of description. The researcher selects or devises valid data gathering instruments or procedures and employs appropriate mechanical, electronic, or psychometric devices to refine human observation, recording, computation, and analysis of data.
5. Research involves gathering new data from primary or first-hand sources or using existing data for a new purpose. Teachers frequently assign a so-called research project that involves writing a paper dealing with the life of a prominent person. The students are expected to read a number of encyclopedias, books, or periodical references, and synthesize the information in a written report. This is not research, for the data are not new. Merely reorganizing or restating what is already known and has already been written, valuable as it may he as a learning experience, is not research. It adds nothing to what is known.
6. Although research activity may at times be somewhat random and unsystematic, it is more often characterized by carefully designed procedures, always applying rigorous analysis. Although trial and error are often involved, research is rarely a blind, shotgun investigation-trying something to see what happens.
7. Research requires expertise. The researcher knows what is already known about the problem and how others have investigated it. He has searched the related literature carefully. He is also thoroughly grounded in the terminology, the concepts, and the technical skill necessary to understand and analyse the data that he has gathered.
8. Research strives to be objective and logical, applying every possible test to validate the procedures employed, the data collected, and the conclusions reached. The researcher attempts to eliminate personal bias. There is no attempt to persuade or to prove an emotionally held conviction. The emphasis is on testing rather than on proving the hypothesis. Although absolute objectivity is as elusive as pure righteousness, the researcher tries to suppress bias and emotion in his or her analysis.
9. Research involves the quest for answers to unsolved problems. Pushing back the frontiers of ignorance is its goal, and originality is frequently the quality of a good research project. However, previous important studies are deliberately repeated, using identical or similar procedures, with different subjects, different settings, and at a different time. This process is replication, a fusion of the words repetition and duplication. Replication is always desirable to

confirm or to raise questions about the conclusions of a previous study.

10. Research is characterized by patient and unhurried activity. It is rarely spectacular and the researcher must accept disappointment and discouragement as he pursues the answers to difficult questions.
11. Research is carefully recorded and reported. Each important term is defined, limiting factors are recognized, procedures are described in detail, references are carefully documented, results are objectively recorded, and conclusions are presented with scholarly cautions and restraint. The written report and accompanying data are made available to the scrutiny of associates or other scholars. Any competent scholar will have the information necessary to analyze, evaluate, and even replicate the study.
12. Research sometimes requires courage. The history of science reveals that many important discoveries were made in spite of the opposition of political and religious authorities. The Polish scientist Copernicus (1473-1543) was condemned by church authorities when he announced his conclusion concerning the nature of the solar system. His theory that the sun, not the earth was centre of the solar system in direct conflict with the older Ptolemaic theory, angered supporters of prevailing religious dogma, who viewed his theory as a denial of the story of creation as described in the book of Genesis. Modern researchers in such fields as genetics, sexual behaviour, and even business practices have aroused violent criticism from those whose personal convictions, experiences, or observations were in conflict with some of the research conclusions.

From the examination of the above characteristics, it is evident that the knowledge gained by research is of highest order. It is not based on assumptions, beliefs, and untested generalizations. To seek such knowledge, a researcher must develop scholarship, accurate observation, integrity, willingness to spend long hours to collect and study all forms of evidence before arriving at conclusions, scholarship and ability to recognize causal relationship, and originality and objectivity in thinking. However, it must be recognized that such ideals serve as goals for which researchers should strive. Being human beings, it is difficult for researchers to realize all ideals completely.

1.6 SIGNIFICANCE OF RESEARCH

"All progress is born of inquiry. Doubt is often better than over confidence, for it leads to inquiry, and inquiry leads to invention" is a famous Hudson Maxim in context of which the significance of research can well be understood. Increased amounts of research make progress possible. Research inculcates scientific and inductive thinking and it promotes the development of logical habits of thinking and organization.

Research provides the basis for nearly all governmental policies in our economic system. For instance, government's budgets rest in part on an

analysis of the needs and desires of the people and on the availability of revenues to meet these needs. The cost of needs has to be equated to probable revenues and this is a field where research is most needed. Through research we can devise alternative policies and can as well examine the consequences of each of these alternatives. Decision-making may not be a part of research, but research certainly facilitates the decisions of the policy-makers. Government has also to chalk out programmes for dealing with all facets of the country's existence and most of these will be related directly or indirectly to economic conditions. The plight of cultivators, the problems of big and small business and industry, their working conditions, trade union activities, problems of distribution, even the size and nature of defense services are matters requiring research. Thus, research is considered necessary with regard to the allocation of a nation's resources. Another area in government, where research is necessary, is collecting information on the economic and social structure of the nation. Such information indicates what is happening in the economy and what changes are taking place. Collecting such statistical information is by no means a routine task, but it involves a variety of research problems. These days nearly all governments maintain large staff of research technicians or experts to carry on this work.

Research is important for social scientists in studying social relationships and in seeking answers to various social problems. It provides the intellectual satisfaction of knowing a few things just for the sake of knowledge and also has practical utility for the social scientist to know for the sake of being able to do something better or in a more efficient manner. Research in social sciences is concerned both with knowledge for its own sake and with knowledge for what it can contribute to practical concerns. "This double emphasis is perhaps especially appropriate in the case of social sciences. On the one hand, its responsibility as a science is to develop a body of principles that make possible the understanding and prediction of the whole range of human interactions. That is, because of its social orientation, it is increasingly being looked to for practical guidance in solving immediate problems of human relations."

In addition to what have been stated above, the significance of research can also be understood keeping in view the following points:

a) To those students who are to write a Master's or Ph.D. thesis, research may mean a careerism or a way to attain a high position in the social structure.
b) To professionals in research methodology, research may mean a source of livelihood.
c) To philosophers and thinkers, research may mean the outlet for new ideas and insights.
d) To literary men and women, research may mean the development of new styles and creative work.
e) To analysist and intellectuals, research may mean the generalizations of new theories.

Thus, research is the fountain of knowledge for the sake of knowledge and an important source of providing guidelines for solving different business, governmental and social problems. It is a sort of formal

training which enables one to understand the new developments in one's field in a better way.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. Define Research.

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2. Enlist the characteristics of research?

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1.7 LET US SUM UP

In this unit you have learnt the concept of research like meaning of research, definition of research, importance of research, characteristics of research and significance of research.

1.8 UNIT- END- EXERCISES

1. What is research?
2. Discuss the importance of research.
3. Why do we need research?

1.9 ANSWER TO CHECK YOUR PROGRESS

1. Research - Definition

John W.Best defines Research, "as the systematic and objective analysis and recording of controlled observations that may lead to the developments of generalizations, principles, or theories, resulting in prediction and possibly ultimate control of events".

2. Characteristics of Research

- Research is directed towards solution of a problem.
- Research emphasizes the development of generalizations, principles or theories.
- Research is based upon observable experiences.
- Research demands accurate observations and descriptions.
- Research involves gathering new data.
- Research is characterised by carefully designed procedure applying vigorous analysis.
- Research strives to be objective and logical.
- Research is characterized by patient and unhurried activity.
- Research is carefully recorded and reported.

1.10 SUGGESTED READINGS

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UNIT-II NEED AND IMPORTANCE OF RESEARCH ON CHILDREN

Structure

2.1 INTRODUCTION

Research on child studies is helpful in evolving developmental norms for different domains, impact of intervention strategies on the different aspects of behavior of children, the nutritional and health status of children leading to follow-up programmes, areas of child health requiring governmental priorities, child education philosophies as reflected in the present day system of education of young children, problems faced by the girl child, policy changes effected by state and national level commissions on pre-school education, importance of play in the overall development of the child, linking pre-school experiences with those of primary school, socialization and the behaviour of the child in different family contexts, parenting styles with their influence on children, influences of extra-family institutions such as peer group, school, neighbourhood religion, state, mass media on the over-all development of the child assessment of the extent to which rights of the child are protected at various levels, problems faced by institutionalized children, success stories with reference to solving the problem of child care, educational, vocational needs of children with special needs, need for providing specialized manpower, assessment and young children based on criteria developed, school-parent and school-community relations etc. are a few examples of areas of research. Whatever be the area/ topic for research, whatever be the methodology, the ultimate objective in doing research on child studies is that children should get quality care so that their future is bright, secure and strong. This unit deals with need for research on children, importance of research on children and problems of research on children.

2.2 OBJECTIVES

After going through this unit, you will be able to

- Understand the need for research on children

- Describe the importance of research on children
- Discuss the problems of research on children

2.3 NEED FOR RESEARCH ON CHILDREN

The simplest definition of a research programme in child psychology derives from an interest in "seeing what happens" to some aspect of behaviour over age. Such an interest may arise from casual observation, from a hunch about the way children develop, or from an articulated theory, but the aim of the researcher is not a systematic and detailed statement of a functional relationship; he is concerned rather with a preliminary survey, or exploration, of some response system. The establishment of a natural history of child behaviour on the basis of such exploration has much to recommend it; the changes we see as children grow are so various and complicated that a primitive taxonomy of behaviour provides initial categories that we may use in building more refined treatments. Over the years, a substantial part of developmental research had been of this kind, dominated by studies of physical growth and of test performance.

Once the over-all picture of a developmental sequence has been drawn by a cross-sectional survey, the psychologist's interest often turns to a closer analysis of variations in the behaviour. He sets up sub-populations for the study of differences within his age groups, then the research becomes more focused, and, although the researcher cannot anticipate his findings in detail, he knows at least the kinds of observations he should make. Two kinds of specification are usually involved here - the more precise definition of the observations of child behaviour to be made and the selection of sub-populations on dimensions. Thus, in the case of the child's responses to maternal pregnancy, the researcher may decide from his earlier survey that a sensitive index of change in response is the child's concern with his own bodily functions; analogously, the researcher may have a suspicion that gender and age will influence the character of the child's behaviour markedly. As a result of these refinements of his original interest, he may fruitfully set up a study that is limited to observation of a particular set of responses in groups of subjects selected on explicit criteria.

The powerful use of research in the testing of explicit hypotheses demands not only the continued careful collection of data but also the building of appropriate and meaningful theories of child development.

2.4 IMPORTANCE OF RESEARCH ON CHILDREN

If children are at risk, our future is at risk. To safeguard our own future, research on children must go on. The findings of a systematic and scientific research will improve the existing practice, programmes and policies meant for children, for comparison, guidance and preparation of children for future, research on child studies is done. The discrimination of these research findings will help the care-giver neither to over-estimate not to underestimate children's capabilities. The care-giver will also be convinced about the vast differences among children.

Many researches have been carried out to examine the lives of children, some of which has been influential on policy and practice. Research on children provides different ways of understanding children and their families, as well as raising important questions about widely accepted assumptions in a range of fields (e.g. in health care, education and social work), such as:

- What sort of contribution can research on children make?
- What are its purposes?
- What role should children play in research, and how might this be different to the role that adults play?
- What considerations need to be taken into account in designing research?
- What are the strengths and weaknesses of the various methods available?
- How does research with children connect with policymaking and practice that are relevant to the lives of children?

To appreciate what is involved in the process of research, we first need to understand how we think about and view children, and how images of them vary across time and cultures. The images of childhood that we hold influence our opinions, judgements and values. This has a significant impact on the way we interact with children, and also on the nature of the research we undertake. But where do these images come from? In this section, we examine images from a historical, cultural and social perspective and try to understand how they have influenced the views we hold today. Childhood is not universal term. How children experience childhood depends on a host of factors, e.g. personality, social circumstances, gender, age, ethnicity, religion and cultural background.

2.5 PROBLEMS OF RESEARCH ON CHILDREN

From the very beginning of civilization, children are made the subject matter of many social and clinical researches. Due to the vulnerabilities of physical frailty and mental immaturity, children’s interests and rights need to be protected from the risks associated with any kind of research. Recently, there has been increased global concern towards the involvement of children in research for the protection of their rights by the ethical research practice. It emphasizes upon the ongoing nature of ethical considerations that ethical issues need to be considered throughout the research process and even the post research ethical issues are equally significant. The following are some of the considerations and problems of research on children:

- ❖ It is difficult for the researchers to get proper permission from the parents concerned.
- ❖ It is very difficult to get proper permission from the institutions and various competent authorities for observing and collecting data for the research on children.

- ❖ It is very challenging task for the researchers to win the confidence of the children and have interaction with the children.
- ❖ A researcher needs more time to spend with the children.
- ❖ A researcher needs unparalleled patience during his research.
- ❖ The researchers must consider the potential negative impacts of research for the children's lives.
- ❖ Children's identity and belonging should be kept confidential.
- ❖ The researchers should focus on the issues arising during research and take all reasonable precautions to ensure children will not be harmed or adversely affected by participating in the research.
- ❖ The researchers have to ensure that the children participating do so at their own volition.
- ❖ The researchers have to ensure that the rights of the child are fully respected in the research process.
- ❖ The researcher is also obligated at all times to use the least stressful research procedure whenever possible.
- ❖ The benefits of conducting such research must be balanced with ethical concerns.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. Why is the research on children important?

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2. What are the problems of research on children?

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2.6 LET US SUM UP

In this unit you have learnt need for research on children, importance of research on children and problems of research on children.

2.7 UNIT-END EXERCISES

1. Explain the need of research on children.

2.8 ANSWER TO CHECK YOUR PROGRESS

1. Importance of Research on Children

- ➢ If children are at risk, our future is at risk. To safeguard our own future, research on children must go on.
- ➢ Many researches have been carried out to examine the lives of children, some of which has been influential on policy and practice.

Research on children provides different ways of understanding children and their families.

- The findings of a systematic and scientific research will improve the existing practice, programmes and policies meant for children, for comparison, guidance and preparation of children for future, research on child studies is done.
- Research findings will help the care-giver neither to over-estimate not to underestimate children's capabilities. The care-giver will also be convinced about the vast differences among children.

2. Problems of Research on Children

- It is difficult for the researchers to get proper permission from the parents concerned.
- It is very difficult to get proper permission from the institutions and various competent authorities for observing and collecting data for the research on children.
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- The researcher is also obligated at all times to use the least stressful research procedure whenever possible.
- The benefits of conducting such research must be balanced with ethical concerns.

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UNIT-III TYPES OF RESEARCH

Structure

3.1 INTRODUCTION

Research is not the exclusive preserve of a chosen few. Any individual belonging to any field of activity can undertake research. Intensive study, deep analysis and reflective thinking are the basic ingredients of research. Application of scientific tools and accepted steps and procedures are essential for an ideal research. It must have utility to the society, result in new findings and, or truth must be brought out. Best, views that, its importance is attested by the tremendous amount of time, manpower and sums of money spent on research by industry, universities and government. The secret of our cultural development has been research, pushing back the areas of ignorance by discovering new truths which, in turn, lead to better ways of doing things and new and better products. In that way, many researches are being done by the researchers of different kind i.e. research done for research sake or application purpose. This unit deals with types of research and areas of research in child studies.

3.2 OBJECTIVES

After going through this unit, you will be able to

- Know the types of research
- Differentiate fundamental research from applied research
- Understand the importance of action research
- Discuss the areas of research in child studies

3.3 TYPES OF RESEARCH

The research can be classified into three types. They are fundamental or basic research, applied research and action research. These are discussed one by one in detail.

3.3.1 Fundamental or Basic Research

Fundamental or Basic research is sometimes also called 'pure research'. It is aimed at the discovery of basic truth or principles and is not immediately concerned with direct field application. Basic research emphasizes control and precision and gives less attention to direct application of the results in a field situation.

Basic research involves the process of collecting and analysing information to develop or enhance theory. Theory development is a conceptual process that requires many research studies conducted over a period of time. Basic researches may not be directly concerned with the social utility of their findings, and it might be years before basic research finds some educational application. The early work of Skinner on reinforcement with birds and Jean Piaget on cognitive development with his two children were basic research efforts that subsequently led to educational application.

According to Travers, "Basic research is designed to add to an organised body of scientific knowledge and does not necessarily produce results of immediate practical value."

Characteristics of Fundamental or Basic Research

1. Laboratory approach: Basic research is usually carried out in the laboratory and a good deal of equipment and apparatus is needed to carry out experiments.
2. Researchers use animal subjects: As research workers are concerned with fundamental principles of behaviour, research with animals permits a much higher level of control than is possible with human subjects; basic research usually uses animal rather than human subjects.
3. Research done by workers in other fields: A lot of basic research bearing implications on education has been done by workers in the other behavioural sciences such as sociology.

3.3.2 Applied Research

Applied research or often called 'field research' is concerned primarily with establishing relationships and testing theories in the field setting and applying to other samples of the population from which the research subjects are taken. For example, a study of the friendship pattern of eighth class students is very valuable if the sample has been chosen in such a way that the results may be expected to apply reasonably well to other samples of the same population.

According to P.V. Young "gathering knowledge that could aid in the betterment of human destiny is termed applied or practical research."

Characteristics of Applied Research

The following are the characteristics of applied research:

- ✓ Applied research is undertaken to solve an immediate problem and the goal of adding to scientific knowledge is secondary.
- ✓ It sacrifices control and precision to some extent as compared with fundamental research.
- ✓ In applied research, the researcher is engaged in conducting enquiries in the complicated psycho-sociological climate of on-going educational activities.
- ✓ There are a large number of variables in applied research, which limit control and precision.
- ✓ Applied research is conducted in real situations, which provide motivation to the researcher, who is interested in the immediate solution of the problem.
- ✓ It is a development aid and is directed towards the development of human society.
- ✓ It is completed in a short span of time.
- ✓ Its findings are evaluated on the basis of local applicability, not in terms of universal validity.
- ✓ It is empirical and man-centered.
- ✓ This method provides sufficient flexibility to permit modification of hypotheses and procedures as the study goes on.
- ✓ While analyzing the problem it synthesizes the approaches developed by different social sciences.

3.3.3 Action Research

Action research sometimes called on-the-job research involves the application of the steps of the scientific method to classroom problems. Action research is similar to applied research in many ways. Applied research, usually involves a larger number of samples as compared with action research. In action research a single teacher carries out many research projects in a single classroom, while all teachers in a school or even a school district may carry others on.

In the words of Jane Franseth of the U.S. Office of Education, "Action research is a systematic examination conducted by individuals or groups studying their own practices in search of sound answers to unresolved problems in their work and aimed at improving their own

performance on their own jobs." Stephen M. Corey, a pioneer in the field says of action research, "One of the best ways to enable people to improve their curricular practices is to make it possible for them to study what they are doing to experiment with ideas that seem to be more promising and to get evidence to find out if they are better."

The same author describes action research as: "Most of the study of what should be kept in the schools and what should go and what should be added must be done in hundreds and thousands of classrooms and thousands of communities. Those who may have to change the way they do things as a result of the studies must undertake the studies. Our schools cannot keep up with the life they are supposed to sustain and improve unless teachers, pupils, supervisors, administrators and school patrons continuously examine what they are doing. Single and in groups, they must use their imagination creatively and constructively to identify the practices that must be changed to meet the needs and demands of modern life, courageously try out those practices that give better promise, and methodically gather evidence to test their worth. This is the process I call action research. I hold no special brief for the name, but it has some currency and is sufficiently descriptive."

Lehmann and Mehrens (1971) point out: "Action research is a type of applied or decision oriented research, but with the stipulation that the researcher is the same person as the practitioner who will make and live with the decision."

According to Best, "Action Research is focused on the immediate application, not on the development of theory, nor upon general application."

Action research places its emphasis on a problem, 'here and now'. It is applicable in local setting. Action research is not mainly concerned in obtaining generalisead scientific knowledge about educational problems but in obtaining specific knowledge concerning the subjects involved in the study.

Practitioners and Action Research

In action research in education, the researchers are usually teachers, curriculum workers, principals, supervisors or others whose main function is to help provide good learning experiences for pupils.

The fundamental point is that teachers, supervisors, and administrators would make better decisions and engage in more effective practices if they, too, were able and willing to conduct research as a basis for these decisions and practices. The process by which practitioners attempt to study their problems scientifically in order to guide, correct, and evaluate their decisions and actions is what a number of people have called action research.

A publication entitled Research in Education published by National Institute of Basic Education stated as:

"Action research is the research a person conducts in order to enable him to achieve his purposes more effectively. A teacher conducts action research to improve his own teaching. A school administrator conducts action research to improve his administrative behaviour.

Action research represents an attempt to be more disciplined, more objective, more scientific. It results in a more careful problem diagnosis and more objective evaluation of the consequences of action. To the degree an action intended to solve a practical problem results from objective, disciplined inquiry into the problem and its causes, the problem is more apt actually to be solved. The customary commonsense approach leads to action but afterwards the problem is often still there. Action research is a procedure that tries to keep problem solving in close touch with reality at every stage."

Scope: The action research approach to deal with practical problems seems to be appropriate and promising for all kinds of professional workers in education so long as their desire is to improve their own professional behaviour. An administrator who is dissatisfied with his efforts to develop good morale in his staff could approach this problem with action research, for example. He would only do so, however, if he accepted some responsibility for the morale situation and was willing to effect some changes in his own behaviour to improve it.

Characteristics of Action Research

1. It is focused on the immediate problem.

2. It is applicable in a local setting.

3. It aims at improving classroom and school practices.

4. It aims at the improvement of professional efficiency.

5. It involves very little finances.

6. The researcher and the practitioner is one and the same person.

Advantages of Action Research

1. A person improves if he remains active in the process and programme he is engaged in.
2. Action research emphasises a desirable decentralisation of decision making and action taking.
3. Action research broadens and deepens the general as well as specific fund of knowledge of the worker.
4. Facts and evidences are stressed which keep the changed process anchored more continuously to reality.
5. Action research approach is experimental rather than dogmatic.

6. Action research helps the teacher acquire new interests, new motives and new insights.
7. One's own findings are willingly implemented and in this context, action research is very useful.
8. After having involved himself in action research, the teacher can play a better role in translating various research findings into action.
9. Action research has a great stimulating effect upon the teacher for finding better ways of doing things.
10. The entry of the teachers into the world of research will enable them to read reports or summaries of research findings more intelligently.
11. Action research introduces experimental outlook among teachers.
12. Action research enables the teacher to organise instructional procedures on a more reliable and sound basis.
13. Action research on the part of the teacher helps students acquire skill in problem solving and scientific methods.

Limitations of Action Research

1. Action research is relatively of poor quality. According to Georg G. Maouly, "Action research can become a case of the blind leading the blind, and the problem is further aggravated by the fact that teachers generally are too close to their too untrained in scientific objectivity to be vigorous and objective in their approach."

2. The applicability of the findings to another school or class in the event of teacher transfer is even questionable. Action research, by and large, is a localised affair.

3. Action research is frequently added to the shoulders of already but busy teachers who have only limited freedom to say 'no'.

4. On account of several limitations, action research may result in unverifiable and deceptive conclusions.

Need and Importance of Action Research in Indian Schools

The need and importance of action research in Indian schools is being felt by all concerned to keep pace with the latest developments in the field of education. A teacher while teaching his students comes across numerous problems. Sometimes he tries to tackle them with great patience and other times being in an angry mood, he scolds the students, turns them out of the class, gives punishment of one form or the other and still at some other times, be overlooks them. If the teachers are encouraged to come out with their problems and are provided necessary facilities in the form of guidance and help in conducting action research, they can solve their problems themselves with great satisfaction to themselves and consequently leading to their professional growth and development.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. What is Fundamental research?

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2. List out the characteristics action research.

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3.4 AREAS OF RESEARCH IN CHILD STUDIES

There has been an upsurge of interest in the area of developmental psychology recently. In the last decade, it has shown the happy trend of extending its scope and broadening its horizons across various aspects of human development. It focusses on changes in behaviour and various abilities accrued as the child grows up as well as on the process of change. The present trend is towards an increasing sense of social relevance and ecologically valid theorizing.

The main objectives of the longitudinal growth studies undertaken in research institutions in India are to collect empirical information about how Indian children progress during infancy and to compare their performance with that of babies of other countries.

These researches use Western scales adapted to the Indian situation. This type of trend is a very common one showing the influence of Western research methodology on Indian social scientists. However, these researches fulfil one basic need-that of giving some type of much needed developmental norms of patterns for Indian children. These researches can serve as the basis for further developmental research as well as the development of tools specifically for the needs of our population in India.

Work related to understanding the basic processes of human development and the universality of the principles of growth and development is of critical importance to provide a sound data base from which information can be drawn for purposes of application.

Deprivation is one of the major concerns of the researches in India and is woven in research designs in one form or other. It may be studied as urban-rural, higher caste-lower caste of socio-economic status differences.

Another favourite field for research is that of congnitive development based on the Piagetian model. In India, as elsewhere in the world, most of the studies have been replications of conservation studies at the concrete operational level.

Some correlational and intervention studies have also been attempted recently. The former type of studies is basically to determine the effect of numerous independent variables associated with the so-called poverty and its consequences, which are peculiar to the Indian situation. Some of these are in terms of socio-economic status, nutritional effect, availability of physical facilities, caste, urban-rural differences and so on. Hence, interpretation of data needs expertise. Most of the findings need to generalized with great caution, because of the existence of great socio-

cultural differences due to the vastness of the country. Even the levels of economic development differ from region to region. It is assumed that these differences will have a differential effect on the behavior and various abilities accrued as the child grows up.

Psychological research in the developing countries will have to pay more attention than it has in the part to interpretations of behaviours and experiences by members of the local population. Since people structure their own social environment, an understanding of how they interpret that environment, and the behaviour which occurs within it will provide clues for the analysis of the inter-action between people and their environment in a particular setting. The child has to be studied in relation to the milieu in which he grows up.

Traditionally, books on child development have taken the stance that their task is to impart to the reader objective and scientific facts about growth and development. Development principles and processes tend to lack vitality and meaning when presented in isolation from the social issues and events in which they are grounded. Hence, there is a necessity to present developmental concepts in the context of contemporary cultural issues and events.

The growing find of knowledge in developmental science provides an increasingly valuable resource for guiding the socialization of the young and for identifying environmental characteristics which may have restricting effects on development. In recognition of this fact, there is need not only to present basic information on developmental characteristics and processes, but also to attempt to deal with the implications and applications of such information in socialization.

The developmental psychology can make distinctive contribution in understanding the process and impact of social change on individual development. The developmental psychology research faces a whole lot of issues at present. Some of them are well known and are applicable to the field of social sciences in general. Others are specific to the field of developmental psychology. One such issue is that lack of concerted effort at sound theory-building in the Indian context. Most of the theoretical base is provided by the Western theories and moulded on the Western thought processes. It is now time for the generation of theory with Indian thought and ethos which will be applicable to the Indian children and generate a new research field.

It is easier to understand one’s own culture after studying one that appears to be different for, without stepping outside oneself, one cannot see oneself. Designs emphasizing the processes are coming to the fore and indicate the direction in which work should be done.

Despite the awareness among scholars that the trend in growth and development, individual difference in patterns of development and definitive antecedent consequent relationships can be best studied through the use of longitudinal designs, few studies of this nature have been undertaken, mostly because of lack of long term commitments by researchers, lack of political will and absence of such an awareness on the part of institutions of the utility of such researchers. More studies of this type need to be undertaken.

The research should proceed in a systematic manner through a coordinated series of researchers focusing on specific problem areas of social relevance. Hence, more field studies may be able to deal with the problem and provide solutions to the policy makers. If child psychology is continue as a discipline in its own right, its continued investment in socially relevant issues is crucial.

Finally, it can be said that basic and applied research both are of equal significance in our field. A fast changing society demands an increase in the adaptive capacity of an individual and development of dispositions favourable to change. This can be viewed as a consequence of change or can be actively developed to facilitate change and self-reliance. In terms of future perspective, as much attention needs to be paid to development of theory and empirical research on fundamental processes, as in responding to social pressures to seek solutions to social problems.

The present trend in research in child studies is that there is a shift from developmental investigations to sociological issues such as care of the children, care giver-child attachment behaviours, different forms of child care, role of the different members in the family as care givers of children, gender differences in child care, etc. We have already seen that child care assumes great significance in the context of women's employment resulting in the demand for balancing multiple roles by women. In this context care of children, especially under 2 years, is of greater interest to research scholars.

Hoffman and Lippit (1976) have provided a scheme for studies on understanding children. This will be helpful in understanding the child in the context of the family. There is a variety of approaches to the study of the family. Sociologists and anthropologists have often been concerned with the family as a social system or as an institution within a society. Recent years have been an increased interest in the family as one type of small group with its own patterns of functional and structural characteristics. Other approaches, which are more psychological, treat the family as an inter-personal system of dyadic relations or focus on the personality and behaviour of individual family members.

Apart from the way in which the family is conceptualized, approaches differ along other dimensions. For example, some investigations have a predominantly taxonomic and descriptive interest in the family, whereas others have primarily an analytic interest in the dynamics of family process and socialization. Still others are largely interested in a diagnostic approach to the understanding of family pathology and health.

As a schema for classifying research designs and procedures, Hoffman and Lippit have chosen a sequence of casualty that goes from the most general and casualty distant variables and moves by steps through variables that are more specific and casually closer to the child's personality and behaviour. The schema used is as follows:

1. Parental background

This category includes such variables as the parent's national origin, educational history and early relations with own parents.

2. Current family setting

This includes such variables as culture, social class, occupation, temporal setting, rural-urban-suburban location, and physical characteristics of home and neighbourhood.

3. Family composition

This includes family size, ordinal position of child, age and sex distribution of siblings, presence or absence of certain family members and special status of family membership (e.g., adopted).

4. Relationships between parents

This includes such variables as power relations, decision-making patterns, division of labour, communication pattern, degree of consensus, and the affective relationship.

5. Personal characteristics of parents

This cluster includes those psychological characteristics of parents not specifically oriented toward the parental function, such as general personally structure, religious values, social attitudes and philosophy of life.

6. Child-oriented parental attitudes

It includes child-rearing goals, concepts about the parent role and child role, attitudes towards parenthood, attitudes about discipline techniques and acceptance or rejection of the child.

7. Overt parental behaviour patterns

This category includes child-rearing and training practices, influences and discipline techniques, responses to child behaviours, changes or inconsistencies in behaviour patterns and types of conflicts with the child.

8. Child's orientation toward parents and siblings

This includes a large set of variables, such as perceptions and evaluations of parent behaviour patterns, attitudes toward parents and sibs, perception of parent feelings and attitudes toward the child himself and perceptions of the relations existing between parents and among all family members. This level in the sequence already involves the child's response to the family situation.

9. Overt child behaviour toward other family members

This includes the categories of child response to others, such as reaction to discipline and spontaneous initiated actions such as attention-demanding behaviour, hostility and affection.

10. Personal characteristics of the child

This category consists of a variety of variables, such as intelligence, physical characteristics, ego structure, super-ego formation, conception and evaluation of the self, emotionality and basic need tendencies.

11. The child away from the family

This focuses on the child's attitudes and behaviours in areas other than the family, such as interaction with peers and the child's behaviour at school.

The Network for Research was initiated by M.S. Swaminathan Research Foundation Chennai to promote and document studies on various aspects of child care services in Tamil Nadu. Sharing information on research-issues related to women's development and child care, identifying

gaps in information, developing a common research agenda on the identified issues, exchanging ideas, offering mutual support in planning and designing studies and evolving appropriate research methodology are some of the main objectives of the Network.

Since its inception in November 1993, the inter-disciplinary Network has initiated several studies at post-graduate level apart from identifying several broad areas in child care research. There are at present about 70 members in the Network. The long-term goal of the Network is to stimulate inter-disciplinary multi-centric research on child care and improve the quality of research on the subject.

In the Report of the consultation held by members of Research Network on 25th July 1995, several priority areas of research on ECCE were pointed out.

The outcomes of the consultation have been summarised thus:

1. It was suggested that the Planning Commission identify specific priorities with regard to children 0-6 years, linked to policy requirements, which could be taken up for research. The Planning Commission is already at work on this task and further probing will be done to collect the specific information needed with regard to programmes for young children.
2. The research community could look into the cost effectiveness of various existing schemes in order to evaluate the current strategies and suggest new ones.
3. Evaluation studies on current services for the 0-6 age group could be taken up, especially on the extent peoples' participation in government programmes. So far only Tamil Nadu Integrated Nutrition Project and Swedish Inter-national Development Authority have an in-built evaluation programme. Independent evaluation studies have greater credibility and could be sent to the Planning Commission for consideration.
4. The importance of the gender dimension and of undertaking gender analysis of existing data was emphasized. Since most socio economic studies conducted at the university level already included data on household composition, gender ratios in each age group and other gender analysis could easily be taken up. The finding that sex role stereo-typing is fixed by the age of 5 years is very significant and suggests the need for policy interventions at various levels - in curriculum, training, media etc. Other kinds of gender differences and their causes need to be studied.
5. In identifying gaps in services other than health and nutrition should be given due importance, e.g. provision of adequate water supply and sanitation. Similarly, social mobilization should focus not only on breast feeding but also on introduction of supplementary food and for weaning.
6. Structural adjustment programmes and their impact on child care programmes should also be studied.
7. Specific needs of children of various groups, 0-2 years and +2 years, should be thought of. Even within the 0-2 age group, there should be differentiation between children 0-6 months who need

exclusive breast feeding, and the test, as well as special attention to the age-group 13-24 months which is 'critical' as far as malnutrition is concerned.

Ms. Khin Sandi Lewin presented under solved problems in research related to gender, resource allocating, malnutrition, reaching the unreached community areas and cost effectiveness.

One can look at the category of women and children 0-6 not only in terms of sectors like Health, Education, Nutrition, Child Development including Water and Sanitation but also at the specific age-groups or target groups:

a. Taking the 0-6 months child as the starting point first comes low birth weight as a problem. From that to the first year of life of the infant is the next step.
b. The period 0-2 years which is critical age for malnutrition.
c. 3-6 years old is a pre-school child, needing a different kind of attention.
d. Next comes the whole area of women's needs in the child-bearing and -rearing age.
e. Another group often forgotten is the pre-adolescent young girl, whose development affects maternal health and low birth weight later on.
f. One must not forget the role of fathers / husbands in child care, as well as mothers-in-law and other family members.
g. Services and service providers, both government and private form an important area of concern.
h. The overall context of socio-economic environment, government policies and priorities which influence the child and services for the child.

These are some of the broad areas of concern.

Mrs. Mina Swaminathan has given three major areas of research which will be of interest to Education sector.

1. Impact on Child Development of different models of Pre-school Education, Early Stimulation and Diverse Curricula

One area of study could be of gender bias in the curriculum at the pre-school level and its relationship to sex role stereo-typing, as well as relative influence of home and school in this regard. Findings in this area could lead to rethinking on policies and schemes, including those which directly touch the family, through the social environment, media etc., and another example would be of studying the varying impact of play-based curriculum and formal curricula on children. With regard to the link between Early Childhood Education and later schooling, some studies have already been done, in different parts of the country, comparing children attending ICDS programmes with children not exposed to such programmes, on indicators such as enrolment, performance, attendance and retention at school. In Tamil Nadu today the limitation is that almost all children are exposed to some sort of pre-school education. So it may be difficult to find non-exposed groups for comparison. But it would be worthwhile to study the relationship differences in outcomes to difference in the quality and orientation of various pre-school programmes.

It is also essential to study the percentage of population still unreached by child care services like health, immunization and education and identify the reasons for these.

2. Early Childhood Education in the Private Sector

Recently, Early Childhood Education in the private sector has been mushrooming, both in urban and rural areas, in the form of unrecognized 'convent', 'nursery' and 'KG' schools of poor quality. While it is surmised that many common practices in this sector could have serious negative consequences on children, there is no systematic evidence on either the extent or nature of the phenomenon. The research community should take cognizance of these developments and gather empirical evidence which could lead to regulatory legislation aimed at qualitative improvements, as well as pointing to the need for training.

3. Siblings in Child Care

The third important issue, which also came up from the study on child care strategies of working women, is the key-role played by siblings in child care and its relationship to school attendance and drop-out of the older siblings at the elementary school level. In spite of Tamil Nadu having the second highest enrolment rate, next only to Kerala, the number of girls and boys dropping out of school in order to take care of their younger siblings (apart from doing other domestic work) is high.

To realize the aim of 'Universalisation of Elementary Education' it would be necessary to think in terms of providing support services like crèches near or at primary or middle schools, especially girls, schools.

This would throw light on both the issues of the impact of pre-school education on children's later education as well as that of their siblings.

Mrs. Rajammal Devadas has provided key-pointers to research on the young child. Following are a few key-pointers that are critical in planning, conducting and evaluating 'child in focus' researchers.

1. The research areas in child-related priorities must be identified and sent to institutions involved in developmental researches related to young children.
2. Researches undertaken must offer special attention to the needs of children who are in need of protection. Priority targetting of girls, working children and other educationally backward children is important.
3. Research studies that provide objective data, meaningful inputs and alternative approaches should be undertaken at all levels especially by the academic institutions and the home scientist.
4. Multi-centric researches need to emerge, Inter-disciplinary and inter-departmental collaboration is imperative in future researches in order to promote the total development of the child.
5. Careful designing including relevant research methodologies and pinpointed statistical applications are essential to contribute specific ideas regarding the child in various contexts to planners and policy makers.

6. Collation of principles of research documentation and statistical application must be undertaken to improve the quality and standard of research.
7. Publication on both long and short-term thrust areas of research that are need-based and context-specific should be undertaken.
8. Assignments on "the state of the art" on specific issues could be prepared to enthuse young researchers recognize the need for child oriented researches.
9. Action-oriented researches must be undertaken to overcome the problems and pitfalls identified so far to create better infrastructure /service for children.
10. The researches must transcend transfer of technology as science and technology is fast advancing children and women need to comprehend scientific advancements to improve their standard living.
11. Child-oriented research programmes must have an 'Integrated Package Deal' and not be of piecemeal and sporadic nature.
12. Action-oriented researches need to be planned establishing linkages with national institutions and forces working for children.
13. Care Studies should be solicited to bring to light success stories and culture-specific approaches in developmental programmes for children.
14. Government of Tamil Nadu accords high priority to the advancement of women and children through its 15 point programme for Child Welfare. Concerted efforts need to be made to research the quality, access and benefits accruing, from each of these 15-point programmes. Evaluatory and qualitative studies on these programmes might throw light to improve their growth, survival and development. Standard parameters evolved for such studies might facilitate uniform standards and large scale data.
15. Innovative researches on low-cost strategies through which programmes for child welfare, education and training could be replicated are required.
16. Re-charging young researchers to develop good research proposals and finding suitable cost-effective technique is another area that carries significance.

    With these pointers in view, the following areas need urgent attention:

    1. Functioning of Anganwadies / Creches / Play Centres.
    2. Profile of beneficiaries of existing child care services.
    3. Quality of services in developmental programmes for women and children.
    4. Impact of intervention programmes on women and children.
    5. Innovative approaches / play packages on Early Childhood Education.
    6. Pressures on pre-school children.
    7. Evaluation of pre-school teacher training institutes.
    8. Child care needs of women in organized and unorganized sectors.
    9. Status and conditions of child workers.
    10. Non-formal approaches for drop-outs, child care workers, disadvantaged children in remote areas and disabled children.
    11. Traditional and folk medicines used for children.

12. Role of grandparents in child care.
13. Awareness and use of electronic and print media for parenting.
14. Aspirations of the community for its children.
15. Perception of child care workers towards child welfare.
16. Breast feeding in different cultural contexts.
17. Instructional packages for child care personnel at different levels.
18. Integrated Vs Sectoral approaches in child care.
19. Girl child-gender inequity.
20. Street children-emerging issues.
21. Women, children and the law.
22. Integrated education for disabled.
23. Community based rehabilitation for disabled.

The goal of research must be to strengthen the full and equal participation of women and the holistic development of children.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

3. Enlist some areas of research in child study.

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3.5 LET US SUM UP

In this unit you have learnt types of research such as fundamental research and its characteristics; applied research and its characteristics. In action research, characteristics, advantages and limitations of action research and finally areas of research in child studies have also been discussed.

3.6 UNIT-END EXERCISES

1. Define - Applied research.

2. List out the characteristics of applied research.

3. What is the importance of action research in Indian school?

4. Enlist the advantages and limitations of action research.

3.7 ANSWER TO CHECK YOUR PROGRESS

1. Fundamental Research

Fundamental research involves the process of collecting and analysing information to develop or enhance theory. Theory development is a conceptual process that requires many research studies conducted over a period of time. Basic researches may not be directly concerned with the social utility of their findings, and it might be years before basic research finds some educational application. The early work of Skinner on

reinforcement with birds and Jean Piaget on cognitive development with his two children were basic research efforts that subsequently led to educational application.

2. Characteristics of Action Research

1. It is focused on the immediate problem.
2. It is applicable in a local setting.
3. It aims at improving classroom and school practices.
4. It aims at the improvement of professional efficiency.
5. It involves very little finances.
6. The researcher and the practitioner is the one and the same person.

3. Areas of Research in Child Studies

1. Functioning of Anganwadies / Creches / Play Centres.
2. Quality of services in developmental programmes for women and children.
3. Impact of intervention programmes on women and children.
4. Innovative approaches / play packages on Early Childhood Education.
5. Pressures on pre-school children.
6. Child care needs of women in organized and unorganized sectors.
7. Status and conditions of child workers.
8. Non-formal approaches for drop-outs, child care workers, disadvantaged children in remote areas and disabled children.
9. Role of grandparents in child care.
10. Street children-emerging issues.

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UNIT-IV RESEARCH PROBLEM

Structure

4.1 INTRODUCTION

Selecting a problem for research study is not always an easy task. For some of the people, the topic may pop into the mind immediately just like that. For many others, however, this may not happen like that. The researcher may need to be more systematic to carefully choose a topic that he / she wishes to explore further. He may have one or two ideas or may have many ideas. Before making a final decision about the research topic or problem in which he wishes to invest a lot of time and effort, he should make sure that he has done a great deal of thinking and has read and consulted subject-specific journals and referred to the type of research that was being done on his topic. The research problem can be related to a career aspiration. This unit deals with steps in developing a research project, selection of a research problem and where to look for problem of research.

4.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of research proposal
- Describe each of the components of a research proposal
- Select a research problem for the study
- Look for a suitable problem to study

4.3 STEPS IN DEVELOPING A RESEARCH PROJECT

The preparation of a research proposal is a prerequisite in the process of research. In many institutions, a researcher is required to submit a proposal of the research project for approval. This serves as a basis for the determination of the feasibility of the project and provides a systematic plan of procedure for the researcher to follow. It also gives the research

supervisor or guide (if any) a basis for guiding the researcher in his pursuit of study.

A research plan is a detailed description of the procedures that will be used to investigate the topic or problem. It includes justification for hypotheses, a detailed presentation of the research steps that will be followed in collecting, choosing and analysing data and an estimated time schedule for each major step.

The research proposal is a systematic plan, which brings to focus the preliminary planning that will be needed to accomplish the purpose of the proposed study. It is just like a blueprint which the architect prepares before the construction of a building starts. The initial draft of the proposal is subject to modification in the light of the constructive criticism, comments and suggestions of the experts in the field. These experts include researcher's supervisor, colleagues, research and statistical specialists, or other experienced researchers who act as members of the research committee of an institution or organization.

Preparation of the Research Proposal

There are certain specifications that are essential to good research and, therefore, all such specifications should appear in each plan. A worthwhile research study is likely to result only from a carefully planned and well-designed proposal. The following categories of information should appear in the research proposal.

I. INTRODUCTION

The introductory part of the proposal should include the following information:

1. The Title

The title of the research proposal should do no more than name the topic. It should be so worded that it suggests the theme of the study. In selecting a title, the researcher should consider two things:

(i) The title should not be burdened by pompous words and should not include terms of unscientific; rhetorical, argumentative, emotional, or biased nature. The language in the title should be professional in nature but not pedantic.

(ii) The title should not be too lengthy or too involved. It should be specific to the area of study. An adequate title for a study is one which represents a reasonable restriction and implies an objective approach. It must be noted that the proposed study cannot be completely presented in the title; but it should be so worded that it would give sufficient information about the nature of the study.

2. Statement of the Problem

Statement of the problem is not exactly the same as the title of the thesis. It has a definite place in the introductory chapter and is an attempt

to focus on a clear goal. Statement of the problem should primarily be an expansion of the title. It should be either in question form or as a declarative statement. The major question or statement may be followed by several minor questions or statements and explanations.

3. Review of Related Literature

The theoretical and empirical framework from which the problem arises must be briefly described. Both conceptual and research literature are to be reviewed for this purpose. The latest research trends pertinent to the problem should also be mentioned in this section. The researcher has to make it clear that his problem has roots in the existing literature, but it needs further research and exploration. A brief resume of related studies found in journals, magazines, abstracts, and reports should be made. This provides evidence that the researcher is familiar with what is already known and also with what is unknown. An analysis of the previous research eliminates the risk of duplication of what has been done, and provides a basis for formulating hypotheses.

4. The Hypotheses

Questions that the research is designed to answer are usually framed as hypotheses to be tested on the basis of evidence. This step establishes the problem and the logic underlying the research study. It gives direction to the data gathering procedure. It is in the light of the hypotheses that the relevance of data to be collected is judged.

The formulation of the research hypotheses is• typically determined by the implications of the related literature and the deductive logic of the problem under investigation.

5. Significance of the Study

A research proposal should show the worth and urgency of the study. It should indicate clearly how the results of the research can influence educational theory or practice. The need for undertaking a research study can be shown in several ways.

One way of establishing a need for a research study is to show the time lapse between the earlier study and the present one; and therefore the new knowledge, techniques, or conditions indicate a need to replicate the study.

A second way of justifying the need for a study is to show that there are gaps in the knowledge provided by previous research studies and to show how the present study will help to fill in these gaps and add to the quantum of existing knowledge.

A third way to justify the need for a study is to show the lack of information about a problem by presenting the supporting statements of other research studies.

A final way to justify the need for a study is to relate it to the existing social issues and to priority areas in the context of national and international educational developments.

6. Definition of Terms and Concepts

It is necessary to define all unusual terms and concepts that could be misinterpreted. The technical terms or words and phrases having special meanings need to be defined operationally. We seldom come across unanimous definition or modes of measurement for certain concepts and terms, such as intelligence, motivation, achievement, etc., and in such situations, it becomes obligatory on the part of the researcher to provide an operational definition of such terms or concepts by stating how the variables will be measured and interpreted. The Dictionary of Education, edited by Carter V. Good; the Comprehensive Dictionary of Psychological and Psychoanalytical Terms, edited by Horace B. English and Eva C. English; and the Dictionary of Sociology, edited by H.P. Fairchild are valuable sources for definitions of technical terms.

7. Delimitations of the Study

Boundaries of the study should be made clear with reference to (a) the scope of the study by specifying the areas to which the conclusions will be confined, and (b) the procedural treatment including the sampling procedures, the techniques of data collection and analysis, the development of measuring tools and their use in the study.

8. Basic Assumptions

Assumptions are statements of ideas that are accepted as true. They serve as the foundation upon which the research study is based. According to Turney and Robb (1971, p. 29):

They are written to reveal what the researcher, and others, theorize to be true in the study to be conducted; moreover, they are also written to indicate those factors affecting the study that are necessarily unalterable.

The researchers in writing their proposals should select their basic assumptions with care and be particularly aware of certain common errors. Turney and Robb (1971, p. 30) have listed these errors as under:

1. The first error is failure to state all of the basic assumptions that are relevant to the study. This situation usually occurs in questionnaire studies, in which necessary assumptions are taken for granted without being designated as basic assumptions of the study.
2. The second error concerns irrelevant assumptions. Such assumptions are neither applicable nor necessary to the study.
3. The third error is that of selecting unsubstantiated assumptions which cannot be defended by any logic, empirical evidence (objective data), or authoritative sources.

II. PROCEDURES FOR COLLECTING DATA

In this section the details about sampling procedure and the data collecting tools are described. It may be noted that in historical and philosophical researches the nature of the data and their treatment is different from other types of researches.

1. Sampling

In research situations the researcher usually comes across unmanageable populations, wherein large numbers are involved. In such cases, the researcher may use different sampling methods, such as random, systematic, multistage, stratified, cluster, judgement, or quota sampling depending upon his requirement. The researcher should be well informed about the scope and limitations of each one of these sampling methods before he thinks of his own sample in the study. A research proposal should clearly define the population from which the researcher will draw his sample, and describe the procedure he will use to select the sample.

2. Tools

In order to collect evidence or data for a study the researcher has to make use of certain testing and non-testing tools such as intelligence tests, aptitude tests, achievement tests, personality inventories, observation, interview, questionnaire, rating scales, etc. The researcher must be well versed in the development and use of these tools and fully aware of their merits and demerits.

The research proposal should explain the reasons for selecting a particular tool or tools for collecting data. The proposal should also include the reported evidence of the reliability and validity of the standardized tools for the purpose of the study. The researcher should take help of Mental Measurement Year Books (Buros), Indian Mental Measurement Year Book (NCERT), and other similar literature on test development for the selection of appropriate standardized tools. If he is developing his own tools, he should outline the procedure to be followed in their development.

III. PROCEDURES FOR TREATING DATA

In this section the researcher describes how to organize, analyse, and interpret data. The details of the qualitative and quantitative (statistical) techniques and the rationale for using such techniques should be described in the research proposal. In case of historical research, it is necessary to throw light on the methods of internal and external criticism that are to be adhered to in the analysis of data: In documentary studies, mode of content analysis should be explained in the research.

IV. BIBLIOGRAPHY

In each research proposal, the researcher should give a list of books, journals, and other documents that he has used in selecting the problem and which he may use during the tenure of study.

V. TIME SCHEDULE

A realistic time schedule is equally important for both beginning researchers working on a basis or dissertation and for experienced researchers working under the deadlines of a research grant or contract. It is infrequent that a researcher has unlimited time to complete a study. The existence of deadlines typically necessitates careful budgeting of time. Basically, a time schedule includes a listing of major activities or phases of the proposed study and a corresponding expected completion time for each activity. Such a schedule in a research plan enables the researcher to assess the feasibility of conducting a study within existing time limitations. It helps the researcher to stay on schedule during the execution of the study and dividing a study into phases and assigning dates for the completion of each phase helps the researcher to use his time systematically.

VI. BUDGET SCHEDULE

The research proposals which are submitted to government, private or autonomous agencies for financial assistance should also include a budget proposal estimating the funds required for travel expenses, typing, printing and binding, purchase of equipment, tools, books and other materials.

4.4 SELECTION OF A RESEARCH PROBLEM

The competence to develop a good research topic is an important skill. When deciding on a topic, there are a few things that a researcher should consider and do seriously:

- Brainstorm for ideas. It will help focus the topic by discussing issues that did not occur at first.
- Check the procedures in the institution before selecting the topic.
- Identify and choose a topic that will enable the researcher to read and understand the literature.
- Be sure that the topic is manageable and that material is available.
- List of key words to be prepared.
- Define and make sure that the topic is a focused research question.
- Look at available research close to the topic and read more about the topic.
- Formulate a thesis statement.

When a researcher looking for a problem or topic for the study, many places and people may inspire him / her. However, the topic a researcher selects should be one that can be dealt with in an appropriately academic manner within the means (resources) and time constraints of the research. A researcher has to be sure that:

- ✓ The topic will sustain the interest during the months to come.
- ✓ The selected topic can be approached with analytic distance.
- ✓ There is enough literature and reference material.

- ✓ The topic is manageable with the time and resources available.

When the range of phenomena that the researcher may study is contemplated, it is realised that he should approach his task with considerable humility. Out of a group of recognised problems a choice has to be made so that they may be tackled one at a time. One problem may be selected rather than the other, (l) because of its interest, (2) as a basis of further study, (3) to improve educational conditions, or (4) to further personal ambitions. In order to discover problems he has to get acquainted with the field through an approach to varied sources in the form of books, courses, periodicals, proceedings of learned societies, lists of theses, historical analyses, reports of conferences, survey of scientific studies of all kinds, and so on.

4.5 WHERE TO LOOK FOR PROBLEM OF RESEARCH

In answer to this question, a researcher may find topic or problem for his / her study in the following way:

1. In the conflicts experienced by one who is being educated or who is performing some type of work with children. Incongruities, contradictions, points of controversy and untested conclusions in any area can be made a subject for research.
2. Among the suggestions for needed research made by child psychologists, developmental psychologists, childcare members, educators, educationists and research workers. By following clues obtained from reading and contemplating on such suggestions one can always discover worthwhile topics for research. Assignments in the text-books, special assignments, reports and papers may easily suggest areas of needed research. Besides, there are specialized sources as Encyclopedia of Educational Research, Psychological Abstracts, The Review of Educational Research, The Journal of Experimental Education, the Journal of Educational Research, The Doctors' and Masters' Theses, Dissertation Abstracts. Sources of this nature are good for problem-seekers.
3. In the research work already completed to an intelligent mind, lists of thesis already completed may suggest other problems in the same, related, or so far neglected areas.
4. Gaps or deficiencies in explanations, ' Areas of darkness', so to say, may suggest supplementary problems to fill in those blanks.
5. Past theories which seem to need re-examination because of the rise of certain doubts as to their soundness.
6. The classroom, school, home, play-ground, creche, or community which is always a logical source for problems with which a worker is confronted every day. Classroom lectures, class discussions, seminar reports and out-of-class exchanges of ideas with students and professors may suggest many stimulating problems.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Give the skeleton of a research proposal.

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2. Where can a researcher look for research problem?

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4.6 LET US SUM UP

In this unit you have learnt steps in developing a research project such as introduction, procedures for collecting data, procedures for treating data, bibliography, time schedule and budget schedule and then selection of a research problem and where to look for problem of research.

4.7 UNIT-END EXERCISES

1. Elaborately discuss the steps in developing a research proposal.
2. How can a researcher select a problem for the study?
3. Write a short note on delimitation.

4.8 ANSWER TO CHECK YOUR PROGRESS

1. Skeleton of a Research Proposal

I. INTRODUCTION
1. The Title
2. Statement of the Problem
3. Review of Related Literature
4. The Hypotheses
5. Significance of the Study
6. Definition of Terms and Concepts
7. Delimitations of the Study
8. Basic Assumptions

II. PROCEDURES FOR COLLECTING DATA
1. Sampling
2. Tools

III. PROCEDURES FOR TREATING DATA
IV. BIBLIOGRAPHY
V. TIME SCHEDULE
VI. BUDGET SCHEDULE

2. A Researcher can look for research problem in the following areas

1. In the conflicts experienced by one who is being educated or who is performing some type of work with children. Incongruities,

contradictions, points of controversy and untested conclusions in any area can be made a subject for research.

2. Among the suggestions for needed research made by child psychologists, developmental psychologists, childcare members, educators, educationists and research workers. By following clues obtained from reading and contemplating on such suggestions one can always discover worthwhile topics for research. Assignments in the text-books, special assignments, reports and papers may easily suggest areas of needed research. Besides, there are specialized sources as Encyclopedia of Educational Research, Psychological Abstracts, The Review of Educational Research, The Journal of Experimental Education, the Journal of Educational Research, The Doctors' and Masters' Theses, Dissertation Abstracts. Sources of this nature are good for problem-seekers.
3. In the research work already completed to an intelligent mind, lists of thesis already completed may suggest other problems in the same, related, or so far neglected areas.
4. Gaps or deficiencies in explanations, ' Areas of darkness', so to say, may suggest supplementary problems to fill in those blanks.
5. Past theories which seem to need re-examination because of the rise of certain doubts as to their soundness.
6. The classroom, school, home, play-ground, creche, or community which is always a logical source for problems with which a worker is confronted every day. Classroom lectures, class discussions, seminar reports and out-of-class exchanges of ideas with students and professors may suggest many stimulating problems.

4.9 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
2. Radha Mohan (2014). Research Methods in Education. Hydrabad: Neelkamal Publications Pvt. Ltd.
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UNIT-V SELECTION OF THE PROBLEM

Structure

5.1 INTRODUCTION

The researcher may select a problem for investigation from a given theory in which he has considerable interest. In such situations the researcher must have thorough knowledge of that theory and should be sufficiently inquisitive to explore some unexplained aspects or assumptions of that theory. Research problem can also be selected on the basis of daily experience of a researcher. Every day problems constantly present something new and worthy of investigation and it depends on the sharpness of the researcher's intellect to tend his daily experiences into a research problem. Technological developments in a fast changing society are constantly bringing forth new problems and new opportunities for research. A good starting point either for selecting or for learning about a topic is someone who is well acquainted with the topic, perhaps someone who has been involved in research in the topic. This unit deals with criteria for selection of the problem, justifying the significance of the problem and the value of review of related literature.

5.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the criteria for selection of a problem
- Justify the significance of the problem
- Understand the value and purpose of review of related literature
- List out the importance of review of related literature

5.3 CRITERIA FOR SELECTION OF THE PROBLEM

The factors are to be considered in the selection of a research problem both the criteria external and personal. External criteria have to do with such matters as novelty and importance for the field availability of

data and method, and institutional or administrative cooperation. Personal criteria involved such considerations as interest, training, cost and time, etc.

The criteria for the selection of the problem suggested by Good and Scates are as follows:

1. Novelty and avoidance of unnecessary duplications.
2. Importance for the field represented and implementation.
3. Interest, intellectual curiosity, and drive.
4. Training and personal qualifications.
5. Availability of data and method.
6. Special equipment and working conditions.
7. Approachability of the sample.
8. Sponsorship and administrative cooperation.
9. Hazards, penalties and handicaps.
10. Cost and returns.
11. Time factor.

1. **Novelty and avoidance of unnecessary duplication**

   The question of novelty or newness is not merely one of duplication of earlier investigations. It involves the regency of the data summarized especially in the case of survey studies made during a period of great Economic, Educational and Social change.

2. **Importance for the field represented and implementation**

   This criterion of importance in choice of a problem involves such matters as significance for the field involved, timelines and practical value in terms of application and implementation of the results. Scientific research in Education, Psychology and Social sciences in general have an especially urgent obligation to play a social role rendering service to society and humanity.

3. **Interest, intellectual curiosity and drive**

   One of the personal motives of research most frequently mentioned by scientists themselves is pure curiosity, accompanied by genuine interest and a derived satisfaction and enjoyment.

4. **Availability of data and method**

   The data under consideration must meet certain standards of accuracy, objectivity and verifiability.

5. **Special equipment and working conditions**

   The major purpose of equipment is to define the process of observation to provide control of conditions and accuracy for permanence of recording.

6. **Sponsorship and administrative cooperation**

   It is a common practice for the thesis to be sponsored by a faculty adviser in whose area of specialization the problem lies.

7. **Costs and returns**

   The researcher must consider carefully his own financial resources, the light of such facilities and assistance as can be provided by the institution.

8. Time factor

As a general rule the minimum amount of graduate work for the master's degree is one year, and for the Doctor's degree three years.

Historical, experimental, case and longitudinal genetic studies frequently require more time than the several types of normative survey work.

5.4 JUSTIFYING THE SIGNIFICANCE OF THE PROBLEM

Hildreth Hoke Mc Ashan has proposed an objective guideline for judging the merits of a problem. The following questions may be raised for justifying the significance of the problem or topic which is selected for the research:

1. Is the problem really important?
2. Is the problem interesting to others?
3. Is this a real problem?
4. Does the problem display originality and creativeness?
5. Am I really concerned with finding the solution?
6. Am I able to state hypotheses from the problem in a testable form?
7. Will I learn something new from this problem?
8. Do I understand the relationship of this specific problem to the broader problem area?
9. Will I be able to select a sample from which I can generalize to some population? Are the sample subjects approachable?
10. Will some other intelligent person be able to replicate the study?
11. Will my proposed data-gathering instruments actually give the information, which I want?
12. Is the study, including the application of its results, practical?

The number of affirmative answers should be required for justifying the significance of the problem or topic which is selected for the research.

5.5 THE VALUE OF REVIEW OF RELATED LITERATURE

Once the research problem is identified and its delimitation made, review of literature is carried out. Sometimes literature review helps in problem identification. But this may be referred to as research reconnaissance. Review of literature means a review or study of literature relevant to the study taken up by the researcher.

Study of the related literature implies locating, reading and evaluating reports of research as well as reports of casual observation and opinion that are related to the individual's planned research project. As observed by J. W. Best, "Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation, man builds upon the accumulated and recorded knowledge of the past."

In the words of Walter R. Borg, "The literature in any field forms the foundation upon which all future work will be built."

The author further observes that if we fail to build this foundation of knowledge provided by the review of the literature, our work is likely to be shallow and naive, and will often duplicate work that has already been done better by someone else.

The literature may be i) research reports, ii) research papers, iii) reference books, iv) periodicals covering issues relevant to the topics of research, v) government policy notes and reports on issues relevant to the topics, vi) relevant statutes, case laws and legal pronouncements, vii) scholarly text books, etc. The literature may be published or unpublished (but must be authenticated), local, national and global, individual or organizational, periodic or one-time and so on.

Objectives of Review of Literature

Review of research report is done to know that research works have already been done on this and related topics or fields, the methodology adopted by them the hypotheses formulated and tested by them, the findings and conclusions, the listed scope for further research, and so on. Similarly review of research papers is intended to know from the papers the thrust issues, the hypothesis the tool of data collection, the methodology, the findings and the implications of them for the research from his current work.

Purpose of Review of Literature

The following are the purposes of review of literature:

1. To avoid duplication of research work, in case an almost similar work as the present one has already been done by someone.
2. To adopt an alternative method of study in case an almost similar work as already done has to be for some reason carried out.
3. To fill up gaps in research by incorporating objectives not thoroughly probed by earlier researchers.
4. To effectively formulate hypotheses in the light of findings of earlier research works or policy pronouncement of governments or statutory development.
5. To test the efficacy of suggested courses of action in earlier works.
6. To ward of methodological problems or troubles that might have been suffered by earlier researchers.
7. To refine the methodology of research in the light of suggested improvement by or for earlier works.
8. To add new dimensions of research in a study based on recommendations of earlier research works or scholarly research papers or legal pronouncements or investigations or other reports.
9. To have an idea of the diverse tools of analysis used by others and that could be used for the present research.

10. To build a theory, review of literature is needed. Fitting the findings of the present work with the findings of earlier work, and on that basis evolving a theory becomes possible.
11. Jonatham Anderson writes that it is useful initially to survey a field of work from the general to the specific or to work from tertiary and secondary sources of information to primary sources.
12. Review of earlier research works also helps in developing an impressive structuring of research report. Based on knowledge gained on this aspect from the structures adopted in earlier works, right structuring of report is worked out.

Importance of the Review of Literature

Review of literature is very much important for a researcher for the following reasons:

1. The review of the literature is the basis of most of the research projects in the physical sciences, natural sciences, social sciences and humanities.
2. A review of the related literature gives the scholar an understanding of the previous work that has been done.
3. The results of the review actually provide the data used in research.
4. It enables us to know the means of getting to the frontier in the field of our problem. Until we have learnt what others have done and what still remains to be done in our area, we cannot develop a research project that will contribute to furthering knowledge in our field.
5. A review of the literature would develop the insight of the investigator. The information thus gained will save the researcher's time and energy.
6. The importance of the review is quite obvious in delimiting the research problem end it better.
7. The review of the literature will give the student the insight he needs to convert his tentative research problem to a specific and concise one.
8. A review of the literature can help the research worker in making him alert to research possibilities that have been overlooked.
9. In the process of reviewing the literature the student is on the alert for finding out research in his area that have proved to be sterile.
10. The review of the literature provides us with an opportunity of gaining insight into the methods, measures, subjects and approaches employed by other research workers. This in turn will lead to significant improvement of research design.
11. A careful consideration of the chapters entitled recommendations for further research in various research studies guides us regarding the suitability of a problem and in assisting us delimiting our research problems.
12. The review provides ideas, examinations and theories of research, valuable in studying the problem.
13. Review prevents repetition of research.
14. Review helps in locating comparative data interpretation of results.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. What are the criteria for selection of a research problem?

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2. Write a few purposes of review of literature.

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In this unit you have learnt the criteria for selection of a problem such as novelty and avoidance of unnecessary duplications, importance for the field represented and implementation, interest, intellectual curiosity, and drive, training and personal qualifications, availability of data and method, special equipment and working conditions, approachability of the sample, sponsorship and administrative cooperation, hazards, penalties and handicaps, cost and returns and time factor. You have also learnt the values, objectives, purpose and importance of review of related literature.

5.7 UNIT-END EXERCISES

1. How will you justify the significance of the problem?
2. Explain the importance of review of literature.
3. What is the objectives of review of literature?

5.8 ANSWER TO CHECK YOUR PROGRESS

1. Criteria for selection of a research problem

1. Novelty and avoidance of unnecessary duplications.
2. Importance for the field represented and implementation.
3. Interest, intellectual curiosity, and drive.
4. Training and personal qualifications.
5. Availability of data and method.
6. Special equipment and working conditions.
7. Approachability of the sample.
8. Sponsorship and administrative cooperation.
9. Hazards, penalties and handicaps.
10. Cost and returns.
11. Time factor.

2. Purpose of Review of Literature

- ✓ To avoid duplication of research work, in case an almost similar work as the present one has already been done by someone.
- ✓ To adopt an alternative method of study in case an almost similar work as already done has to be for some reason carried out.
- ✓ To fill up gaps in research by incorporating objectives not thoroughly probed by earlier researchers.

- ✓ To effectively formulate hypotheses in the light of findings of earlier research works or policy pronouncement of governments or statutory development.
- ✓ To test the efficacy of suggested courses of action in earlier works.
- ✓ To ward of methodological problems or troubles that might have been suffered by earlier researchers.
- ✓ To refine the methodology of research in the light of suggested improvement by or for earlier works.
- ✓ To add new dimensions of research in a study based on recommendations of earlier research works or scholarly research papers or legal pronouncements or investigations or other reports.
- ✓ To have an idea of the diverse tools of analysis used by others and that could be used for the present research.

5.9 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
2. Radha Mohan (2014). Research Methods in Education. Hydrabad: Neelkamal Publications Pvt. Ltd.
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UNIT-VI HYPOTHESIS AND SAMPLING

Structure

6.1 INTRODUCTION

Since interest is a tremendous stimulus to work in any form of endeavour, an investigator should select a problem that he has a consuming desire to solve. The prodigious effort required in research cannot easily be maintained if one feels that his topic is meaningless and boring. An insatiable curiosity about a subject gives the investigator the extra enthusiasm and drive necessary to withstand the prolonged period of exacting work. Strong biases in favour of a particular viewpoint, however, can make it extremely difficult to maintain an objective attitude. Because of this, some workers in the field believe it is best to avoid problems that spring from beliefs to which the individual is deeply attached emotionally. This unit deals with evaluation of a problem, hypothesis and sampling in an elaborate manner.

6.2 OBJECTIVES

After going through this unit, you will be able to

- Know the procedure to evaluate a research problem

- Know the meaning of Hypothesis and Sampling
- Define the terms Hypothesis and Sampling
- Describe the principles of stating hypothesis
- Explain the types of hypothesis with examples
- List out the essentials of a good sample
- Enlist the advantages and disadvantages of sampling
- Discuss types of sampling

6.3 EVALUATION OF A PROBLEM

Finding a problem for research, however, does not mean that it should become the problem of research. One may still have to reject it if one uses his discretion and foresight. Before the proposed research problem can be considered appropriate, several searching questions should be raised.

Questions one needs to ask when selecting a problem or topic

1. Is it interesting? For, if it seems dull and boring to the research worker, there is little hope that he would do justice to it.

2. Is it new? For, if it has been already tackled by some previous researcher, then the duplication of effort would be a sheer waste.

3. Is it significant? For, if it is not worthwhile, if it neither adds to knowledge nor leads to any improvement in the current practices, it would be in vain.

4. Is it feasible? For, a problem may be interesting, significant and new and yet not be a good problem for a particular research worker and he may fail to carry it through to a successful conclusion. One must ask, therefore:

(a) Do I possess the necessary competence to plan and carry out a study of the type this problem warrants? Have I got enough knowledge about the field and sufficient skill to manipulate the required tools and techniques for gathering and interpreting the data?

(b) Are pertinent data accessible? Are valid and reliable data-gathering devices and procedures available?

(c) Will be able to get proper guidance from Faculty member in planning and completing the task? If any sponsorship, co-operation and special permission is required in its execution, will it be available?

(d) Do I have courage and determination to pursue the study in spite of some difficulties and social hazards that may be involved in it? Special risks, penalties and handicaps or costs of physical, financial, personal,

social or professional character may arise any time. Will I be able to face them boldly?

Before expending a tremendous amount of time on a problem, it is only prudent to evaluate its worth. Putting off the evaluation until the conclusion of the investigation is not a recommended practice. In research, evaluation is a continuous process; the investigator begins to evaluate when he first becomes aware of a problematic situation and during the entire analysis of the problem, he keeps questioning whether this is a feasible and worthwhile topic to investigate. Upon encountering evidence that indicates it would be imprudent to proceed, he either drops the problem or refashions it into a more acceptable form. Delaying his evaluation too long or terminating it too soon can cause a researcher to waste months of valuable time conducting a useless investigation or one that he never can complete.

A thorough evaluation of a major research study requires a familiarity with many complex methodological techniques that a researcher can only acquire through considerable study. But an elementary discussion of the considerations involved in evaluation may give him some insight into the process. Because problems in education are multiform and multipurpose, the advisability of undertaking a particular study depends upon two factors: (1) who is doing the investigating? and (2) what is being considered for solution?. The type of problem that is worthy of investigation will vary somewhat for classroom teachers, curriculum committees, research staff of public and private agencies, and graduate students. No matter what type of problem a research worker evaluates, however, he takes both personal and social factors into consideration.

Personal Consideration: Boldly blustering into an investigation is foolhardy if one lacks the necessary qualifications, support, or facilities to complete it. To avoid making such an error, an intelligent investigator explores the following types of questions:

1. Am I genuinely interested in this problem but free from strong biases?

2. Do I possess or can I acquire the necessary skills, abilities, and background knowledge to study this problem?

3. Do I have access to the tools, equipments, laboratories, and subjects necessary to conduct the investigation?

4. Do I have the time and money to complete it?

5. Can I obtain accurate and adequate data?

6. Does the problem meet the scope, significance, and topical requirements of the individual, institution, or periodical for which it is to be prepared?

7. Can I obtain administrative support, guidance, and cooperation for the conduct of the study?

It is only when the above questions are answered in the affirmative, that the problem can be considered a good one. "The criteria for the selection of a problem and standards for its evaluation may be summarized into four principles: in terms of personal interest, personal capabilities, values of the topic and availability of data."

Interest alone will not lead to the solution of a problem. Success cannot be attained if social forces and raw realities prohibit it. Common sense demands that one should work within the framework of the social milieu and his personal potentialities. Hence, when a researcher is extremely eager to undertake a particular study, he should proceed with caution. Insurmountable difficulties may later arise and doom his endeavours if he does not carefully check several factors: Is the college, university, foundation, company, school administrator, or professor sponsoring his work opposed to it? Are his advisers capable of offering competent guidance in this area? Are the necessary equipments, subjects, or facilities available? No matter how enthusiastic he is about a study, these and other stubborn actualities can prevent him from making any progress. A problem may require, for example, that he should read Russian scientific journals, travel to various private libraries for data, obtain access to classified government documents, procure the correspondence of a deceased man from his uncooperative family, possess a knowledge of physiology, and use specialized equipment that is only available at a distant university. If one is unable to do these things, he must face reality and reject the problem - at least for the present.

Social Considerations: Social as well as personal factors must be carefully evaluated when selecting a problem, for a researcher works not only to achieve personal satisfaction, but also to advance knowledge for the good of mankind. Thus, there are a number of other questions one asks when evaluating a problem - questions such as the following:

1. Will the solution of this problem advance knowledge appreciably in the field?

2. Will the findings be of practical value to educators, parents, social workers, or others?

3. What will be the breadth of the application of the findings in terms of range of individuals, years of applicability, and areas of coverage?

4. Will the investigation duplicate the work that has been or is being done adequately by someone else?

5. If this topic has been covered, does it need reworking or extending beyond its present limits?

6. Is the topic sufficiently delimited to permit an exhaustive treatment yet sufficiently significant to warrant investigating it?

7. Will the conclusions of the study be of doubtful values because the tools and techniques available to conduct the inquiry are not adequately refined and sufficiently reliable?

8. Will the study lead to the development of other investigations?

When a research worker becomes interested in a topic, he locates and evaluates all studies relating to it that have been completed or are under-way. If this survey reveals that his proposed problem has already been thoroughly explored, he usually abandons it. He may persist in pursuing the problem, however, if he doubts the validity of the conclusions reached by others, believes new evidence or better techniques have been discovered that require a new investigation, or thinks that there are gaps to fill or extensions to be made in the organized body of educational knowledge.

After having made a rather extensive, analysis of his problem, a research worker may set up a pilot study. This trial study, which precedes the main investigation, may reveal more closely how the variables in the situation operate. It may spot technical difficulties that will develop in establishing experimental control and measuring factors singled out for measurement. The pilot study will help the research worker evaluate whether it is advisable to launch into full scale investigation.

Sawing society is the ultimate objective of scientists. Thus, competent wakes not only give practical considerations to their personal limitations when selecting problems, but also earnestly endeavour to overcome their deficiencies so that they can undertake the most challenging. Because some graduate students are driven by a strong desire to obtain an advanced degree as quickly as possible, they utilize expediency, rather than excellent as their problem selection measuring-stick. They craftily circumvent any investigation that requires them to become proficient in utilizing a difficult statistical procedure to interview people in distance cities, to master a new field of knowledge or to do considerable deductive work in locating primary source materials. Rather than searching for ways to make most significant contribution to research, they hunt for a problem that will demand the least possible effort on their part. The insignificant inquires undertaken by these easy-degree seekers are neither challenging nor interesting; consequently, completing them is the dullest drudgery. Society also suffers, for mankind profits little from surface-skimming investigations. When a profession has multitude of pressing problems to solve, it is tragic that any of its members should waste precious time and talent on trivial studies. Neither the educational profession nor its practitioners will experience satisfactory growth and a sense of significance by side-stepping difficult problems.

6.4 HYPOTHESIS

The word hypothesis consists of two words – Hypo + Thesis. 'Hypo' means tentative or subject to the verification. 'Thesis' means statement about solution of the problem. Thus the literal meaning of the term hypothesis is a tentative statement about the solution of the problem. Hypothesis offers a solution of the problem that is to be verified empirically and based on some rationale.

Again, 'hypo' means the composition of two or more variables which are to be verified and 'thesis' means position of these variables in the specific frame of reference.

In this context, one should know the meaning of dependent and independent variables before knowing the meaning of hypothesis for better understanding in framing hypotheses for the study.

Dependent variables are those variables that the researcher tries to explain (e.g. student achievement). As the name suggests, a dependent variable depends on independent variable(s).

Independent variables are variables that cause, or explain, a change in the dependent variable. An independent variable (sometimes called an experimental or predictor variable) is a variable that is manipulated in an experiment so as to observe the effect this has on a dependent variable.

6.4.1 Meaning and Definition

A hypothesis is something more than a wild guess but less than a well-established theory. In science, a hypothesis needs to go through a lot of testing before it gets labeled a theory. In the non-scientific world, the word is used a lot more loosely. A detective might have a hypothesis about a crime, and a mother might have a hypothesis about who spilled juice on the rug. Anyone who uses the word hypothesis is making a guess. A hypothesis is a tentative statement which is to be tested.

John W. Best defines hypothesis that "It is a shrewd guess or inference that is formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigation."

According to Creswell "Hypothesis is a formal statement that presents the expected relationship between an independent and dependent variable."

According to J.S. Mill "Any supposition which we make in order to endeavour to deduce conclusions in accordance with facts which are known to be real under the idea that if the conclusions to which the hypothesis leads are known truths, the hypothesis itself either must be or at least likely to be true."

According to Barr and Scates "A hypothesis is a statement temporarily accepted as true in the light of what is, at the time, known about a phenomenon, and it is employed as a basis for action in the search for new,

truth, when the hypothesis is fully established, it may take the form of facts, principles and theories."

According to Gorge J. Mouly "Hypothesis is an assumption whose testability is to be tested on the basis of the compatibility of its implications with empirical evidence and previous knowledge."

6.4.2 Need of the Hypothesis

The common use of hypothesis is to test whether an existing theory can be used to solve a particular problem. In day to day life situations when we confront problems often propose informal hypothesis that can be tested directly. In an experimental research, we are interested to predict about the dependent variable from the independent variable. Here the role of hypothesis is very important. A hypothesis may not be required when aim of the study is only fact finding. Even the historical and descriptive researches not only involve in fact finding but also interprete facts to draw generalizations. So the historical research and descriptive research also need hypothesis. To describe the importance of hypotheses Donald Ary and others (1972 PP-73-74) have stated as under.

1. Hypothesis facilitates the extension of knowledge in an area. They provide tentative explanations of facts and phenomena, and can be tested and validated, such explanations if held valid, lead to generalizations which help significant in understanding a problem and theory extend the existing knowledge in the area to which they pertain.
2. Hypothesis provides the researcher with rational statements, consisting of elements expressed in a logical order of relationship which seek to describe or to explain conditions relationships between the elements or variables in hypothesis are known facts and others transcend the known facts to give reasonable explanations for known conditions. The hypothesis enables the researcher to relate logically known facts to intelligent guess about unknown conditions.
3. Hypothesis provides direction to the research. They represent specific objectives and thus help he researcher to determine the type of data needed to test the proposition. The hypotheses tell the researcher specifically what he needs to do and find out in his study. They help in the selection of relevant facts and variables that the researcher needs in his study. Hypothesis provides a basis for selecting the sample and the research procedures to be used in the study. The statistical techniques needed in the analysis of data, and the relationship between the variables to be tested, are also implied by the hypothesis.
4. Hypothesis provides bases for reporting the conclusions of the study. The researcher will find it very convenient to test each hypothesis separately and state the conclusions that are relevant to each.

Thus hypothesis helps the researcher to express the logical relationship between different variables. It facilitates the extension of knowledge in a

particular area. Hypotheses also provide a direction to the researcher. It also provide a base for reporting the conclusions of the research.

6.4.3 Principles of Stating Hypothesis

As we have discussed hypothesis are tentative generalizations or guesses. But these guesses are not wild guesses. It is an intelligent guess based on previous experiences. It is also observed that statement of hypothesis is one of the important task of the researcher. Because a hypothesis not only gives an insight to solve the problem but also describes the relationship between the variables. So that the researcher should know how to state hypothesis. Travers (1978, P.P-76-87) has prescribed seven cardinal principles of stating hypothesis.

1. Hypothesis should be clearly and precisely stated

The hypotheses should be clear, concise and technical in nature. Hypothesis is the most statement of the problem it should state the variables in operational terms like Achievement measured by achievement tests.

2. The hypotheses should be testable

The hypotheses should be so stated that it would be possible to support or not to support the hypothesis by collecting and analyzing data. If the hypotheses are not testable, it would be impossible either to confirm or disconfirm them and therefore they do not help the researcher to draw conclusions. For example, the hypothesis, "The human beings differ among themselves because their souls differ" is not testable. Because in no way it is possible to collect data to support or not to support the hypothesis. Therefore the variables included should have measurability. There should exist tools and instruments to measure the variable. Another important factor about testability of a hypothesis is that it should normally be testable within some reasonable period of time. For example, the hypothesis "Children those who brush their teeth after lunch will not loss their teeth quickly" requires 50 to 70 years for its result. It is not possible on the part of a researcher to wait for such a long period to get the data.

3. Hypotheses should state the expected relationship between variables

A good hypothesis states as clearly and concisely as possible the expected relationship or difference between two variables and defines those variables in operational terms. It helps the researcher to understand, simplifies its testing and facilitates formulation of conclusions. It is not necessary that always the relationship between two variables be causal.

4. Hypothesis should be limited in scope

It is found that being over ambitious the beginners formulate hypotheses with wide scope. It is because the beginners are not aware of the limitations of time, measurability of the variability and especially their own ability to deal with the research problem. The hypothesis should be such that it can be easily tested. So the hypothesis should be treated in terms of time, money, sampling and researcher's ability to test it.

5. Hypotheses should be consistent with most known facts

Hypotheses should be framed on the basis of previous experiences, establishing theories or basis. But when the previously established theories or facts contradict each other at that time the researcher may frame a hypothesis independently to resolve those contradictions.

6. Hypotheses should be stated as far as possible in simple terms
A simply and clearly stated hypothesis makes it easier on the part of the reader to understand the relationship between variables, to test it easily, and facilitates to draw conclusions from data analysis. The hypothesis should be stated precisely without any vague terms.

7. The hypothesis selected should be testable within reasonable time

A good hypothesis should normally be testable within some reasonable period of time. There are some problems which require many years to arrive at a conclusion. For example, as we have discussed earlier the hypothesis. "The 10th grade students who brush their teeth after each lunch, will not lose their teeth quickly" requires a time period more than 40 to 50 years to arrive at a conclusion. But it is not possible on the part of a researcher.

6.4.4 Formulating Types

Hypotheses are of Three Types

- Research Hypothesis
- Null Hypothesis
- Question form Hypothesis

Research Hypothesis (H_a)

A research hypothesis is usually stated in a declarative form postulating the attributes of a phenomenon (Descriptive Hypothesis), the relationship between two variables (Relational Hypothesis) or explaining the cause and effect relationship among the variable (Causal Hypothesis). This can be used for:

- Prediction of statistically significant findings, like significant differences or correlations between groups or among variable.
- Significant difference in any direction.
- Significant difference in the predicted direction.

Descriptive Hypothesis is stated when a study is designed primarily to describe what is going on or what exists. Public opinion polls that seek only to describe the proportion of people who hold various opinions are primarily descriptive in nature. For instance, if we want to know what per cent of the school student population would vote for a girl or a boy in the next School Pupil Leader election, we are simply interested in describing something.

Relational Hypothesis is used when a study is designed to look at the relationship between two or more variables. A school opinion poll that compares what proportion of girls and boys say they would vote for a girl or a boy candidate in the next School Pupil Leader election is essentially studying the relationship between gender and voting preference.

Causal Hypothesis is stated when a study is designed to determine whether one or more variables (e.g. a remedial programme or a new

teaching technique) causes or effects one or more outcome variables. If we did an opinion poll among the teachers of the school to try to determine whether a recent student canvassing drive changed voting preferences, we would essentially be studying whether the canvassing drive (cause) changed the proportion of student voters who would vote a girl or a boy (effect).

These three types can be viewed as cumulative. That is, a relational study assumes that you can first describe (by measuring of observing) each of the variables you are trying to relate. A causal study assumes that you can describe both the cause and effect variables and that you can show that they are related to each other. Causal studies are invariably the most demanding of the three.

Null Hypothesis (Symbol H_0)

The hypotheses we have discussed so far are called research or substantive hypotheses. Research hypotheses cannot be tested directly by available statistical procedures.

The null hypothesis is a statement about a status quo that asserts that any change from what has been thought to be true will be due to entirely random sampling error. The null hypothesis relates to a statistical method of interpreting conclusions about population characteristics inferred from the variable relationship observed in sample. The null form is a statement that asserts that observed differences or relationships merely result from chance errors inherent in the sampling process. It must be remembered that the null hypothesis is ‘supported’ if the results are not significant. The null hypothesis is never ‘proven’.

Example of a null hypothesis: “There is no difference between the mean IQs of athletes and non-athletes.”

Here we are concerned only with establishing whether there is difference or not, and not with the superiority or inferiority of each group. In empirical investigations where statistical tests are to be performed, the research hypothesis must be translated into another type of hypothesis known as a null hypothesis (symbolized as Ho). It is called null because it states that there is "no difference" or "no effect or that there is "no relationship." A null hypothesis states a negative of what the experiment expects or predicts. The null hypothesis is used because it enables researchers to compare their finding with chance -expectations through statistical tests. The null hypothesis assumes that observed differences occurred because of chance alone and hence do not represent real differences at all. Statistical tests are used to determine the probability that the null hypothesis is true. If the tests indicate that observed differences had a very slight probability of occurring by chance, the null hypothesis becomes a very unlikely assumption. Therefore, it can be rejected in favour of an alternative hypothesis. The evidence is sufficient for tentatively, concluding that the difference is real. If the observed differences could easily be a function of chance, the evidence I, insufficient and the null

hypothesis is retained. Testing a null hypothesis is analogous to the prosecutor's work in a criminal trial. In order to establish guilt, the prosecutor (in the legal systemic must provide sufficient evidence to enable a jury to reject the presumption of innocence beyond reasonable doubt. It is not possible for a prosecutor to prove guilt conclusively, nor can researcher obtain unequivocal support for a research hypothesis. The defendant is presumed to be innocent until there is sufficient evidence to indicate that he or she is not, and the null hypothesis is presumed to true until there is sufficient evidence indicate otherwise.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. Define - Hypothesis.

………………………………………………………………………

……………………..……………………………………..…………

2. What are the questions to be asked while selecting a research problem?

………………………………………………………………………

……………………………………………………..………………………

6.5 SAMPLING

Before know the meaning of sampling certain basic terms related to sampling should be given meaning. They are given below.

6.5.1 Meaning and Definition

Population: A group of elements having similar characteristics. It can be human being, living and non-living objects. Population gets as per the study area.

Population is defined as the entire mass of observation, which is the parent group from which a sample is to be formed.

Sample: It is subset of the population. To study the characteristics of the entire population. It is important that sample should represent entire population. This can be possible only by applying appropriate sampling technique.

Sample is defined as the aggregate of objects, persons or elements selected from the population or universe.

Sampling: It is a procedure to draw a representative sample from the population in such a way that the sample elements selected represent the population.

Sampling Bias: Sampling bias is said to occur if the sample unit does not possess the population characteristics. Due to which result may be inaccurate.

6.5.2 Essentials of a Good Sample

A good sample must satisfy certain requisites. They are: i) representativeness, ii) appropriate size, iii) goal oriented, iv) measurability, v) practicability, vi) economical. These essential requisites of a good sample are explained below.

1. Representativeness

Representativeness of the population by the sample must be ensured before further pursuit is made in the course of research. The sample must be representative of the population. Usually any random sample, because of the operation of the principles of statistical regularity and inertia of large numbers, is representative of the population.

2. Appropriate Size

The sample size should be appropriate neither too large nor too small. Larger the sample higher the accuracy and vice versa. But mere size does not ensure accuracy. Appropriate stratification, due proportioning of sample across different strata and such other scientific methods ensure accuracy. It is better, at least the sample is statistically larger, i.e equal to or greater than 30.

3. Goal Orientation

The sample must reflect the goal of the research. If the researcher's goal is just formulation of hypothesis, a less exact sampling exercise may be enough. If the goal is testing of hypothesis a higher exactness is needed in the sampling exercise. If the purpose is estimating population parameter, still higher exactness is needed in the scheme of sampling.

4. Measurability

The sample must help measuring sampling error from sample results. We know sampling error of mean is = $\sigma/\sqrt{n}$; sampling error of proportion is : $\sqrt{pq/n}$ and so on, where, 'σ' is population standard deviation, p = population success proportion, n = sample size. To ensure measurability of sampling error, random sampling need to be adopted.

5. Practicability

A sample must be capable of being practised. The size, the composition of sample elements, the location of the sample elements, etc. must permit contacting them and getting the responses. About 2.5 mn foreign tourists visited India in 2001. Even 1% of tourists means a size of 25000 tourists. Is it possible to meet and collect data from this large number of the sample units? Most of them had already returned home.

How can we elicit views from them? These are the impracticability a sample design must avoid.

6. Economical

One of the main reasons for use of sample studies is the economical or inexpensiveness of this method. So, a sample must be economical to the research firm for contact and collection.

6.5.3 Advantages and Disadvantages of Sampling

There are several advantages and disadvantages of sampling.

Advantages of Sampling

The following are the advantages of sampling:

- Economical: significantly less costly than the entire population
- Increased speed: Less time-consuming than the population to collect, analyse and interpret data
- Greater scope: easier data handling and management, comprehensive scope and flexibility
- Accuracy: accurate and complete studies, authentic results of the analysis, possibility of drawing valid inferences or generalisations
- Practical method: very practical method when the population is infinite
- Rapport: establishes adequate rapport with the respondents

Disadvantages of Sampling

The following are the disadvantages of sampling:

- Biased: possibility of biased selection resulting in erroneous conclusions
- Difficulty in selecting truly a representative sample: difficult to select a truly representative sample for complex topics
- Need for subject-specific knowledge: possibility of serious mistakes due to limited knowledge, training and experience of researcher in sampling theory
- Changeability of sampling units: unscientific method for heterogeneous units of population
- Impossibility of sampling: impossible to select a representative sample in case of small or too - heterogeneous population

6.5.4 Types of Sample Design-Techniques

Following Blalock (1960), most sampling methods can be categorised into two groups:

A) Probability sampling methods
B) Non-probability sampling methods.

A. Probability Sampling Methods

In probability sampling methods, the size of the parent population or universe from which the sample is to be drawn must be known to the

investigator. Besides, each element or individual in the population must have an equal chance of being included in the sample. The positive point of probability sampling method is that, the obtained samples are considered representative and, therefore, the conclusions derived from such samples are worth generalisation and comparable to similar populations to which they belong. Probability sampling provides for calculating the standard error of the distribution.

Probability sampling methods are of three types-

1. Simple random sampling

2. Stratified random sampling

3. Cluster sampling.

1. Simple random sampling

A simple random sample which is known as unrestricted random sample may be defined as a probability sampling method in which each element in the population has an equal and independent chance of being selected. A random selection of rural primary schools in the district would have been such that every school in the district has equal chance of being selected. This sampling method is bias-free, thus the sample has a high probability of being representative of the population. The random nature of the sampling method is expected to act as control for all variables. For example, two groups randomly selected from the same population would be expected to have approximately the same average of physical, psychological, social and demographic characteristics. One of the major disadvantages of simple random sampling is that it does not ensure that the elements which exist in small numbers in the population will be included in the given sample. For example, in a population of 1000 University students only 10 students possess IQ more than 140 (i.e. Genius) and the researcher is to draw a sample of only 50 students from 1000 students. If the researcher wants to include few 'Genius' students in the sample, chances-are very slim that such 'Genius' students would be included.

2. Stratified random sampling

In stratified random sampling, the population is first divided into homogeneous two or more subclasses or strata, which may be based upon a single criterion such as sex, yielding two strata male or female, or upon a combination of two or more criteria such as sex and level of education and so on. A simple random sample of the desired number may be taken from each population stratum, using the table of random numbers. This stratification tends to increase the precision of the analysis because of the homogeneous grouping (subgrouping results in reducing the variance within each sub-group while maximising the variance between groups).

Stratified random sampling may be of two types, they are:

(a) Proportionate stratified random sampling

In this method the researcher stratifies the population according to known characteristics of the population and subsequently, randomly draws the individuals in a similar proportion from each stratum of the population. For example, there are 1000 students in a university, comprising 600 B.Sc., 300 M.Sc. and 100 Ph.D. students. Now the investigator wants to draw a sample of 160 students from the three classes in similar proportion as they appear in the population.

Proportionate stratified random sampling increases the representativeness of the sample drawn,' because those elements that exist in a few numbers are also included proportionately in the sample. In this method, the sampling error is minimized as the sample drawn possesses all the necessary characteristics of the parent population.

(b) Disproportionate stratified random sampling

In disproportionate stratified random sampling method, the samples drawn from each stratum are not necessarily distributed according to their proportion in the population from which they are randomly selected. In other words, some of the strata of the population may be overrepresented and some underrepresented. For example, out of 1000 university students, 700 students are male and 300 female. If the researcher wants to draw a sample of 100 students from the set of 1000, and draws randomly both the males and females in equal number, say 50 each, it will constitute a disproportionate stratified random sample. The investigator puts equal weight to each stratum in selecting the sample, and thereby over represents one stratum (female students) and under represents the other (male students). This method is comparatively less time consuming than proportionate stratified random sampling. But due to overrepresentation of some strata of the population, some bias in the sample may be introduced. Such type of sample may not be truly representative.

3. Cluster sampling.

This is also a random sampling method in which the sampling units are not individual elements of the universe, but groups of elements or clusters. For example, a researcher wants to study the problems of rural school-going children and wants a sample of 10 percent children from the rural schools in the district. The researcher may select at random 10 percent of the rural schools (clusters) in the district and then use as sample all the children attending those schools. This method has some practical advantage. It is easier to test all children in a few schools than to test a group of children scattered at random throughout all the schools in the district. The limitation of this method is that it has large sampling error.

B. Non-probability Sampling Methods

Non-probability sampling is that sampling procedure in which there is no way of assessing the probability of the elements of population

being included in the sample. In this type of sampling, items for the sample are selected deliberately by the researcher instead of using the techniques of random sampling. For instance, rural development activities carried out by Panchayat Raj Institutions in a State are to be studied. A few three-tier Panchayat Institutions in any district may be purposively selected for intensive study on the assumption that they are representative of the entire State. In such a design, the investigator may select a sample which shall yield results favourable to his or her point of view and if that happens, the entire inquiry may get vitiated. Thus, there is always the danger of bias entering into this type of sampling technique. For example, purposively selecting some Panchayats adjacent to Metropolitan cities instead of selecting from remote areas may give a different picture. So the investigator should be impartial, bias-free, having necessary experience and sound judgement to make the research design, reliable. Non-probability sampling methods have some advantages and in some situations this is necessary.

Some of the important techniques of non-probability sampling methods are Quota sampling, Purposive sampling, Systematic sampling, Snowball sampling and Double sampling.

1. Quota sampling

In this method, the elements of the sample are selected until the same proportion of selected characteristics which exist in the population is reached. For example, in a population of 10,000 individuals, 1000 people belong to upper class, 7000 and 2000 people respectively belong to middle and lower classes. If the investigator wants to select 1000 individuals, and finally selects 100 individuals from upper class, 700 from middle class and 200 from lower class, according to convenience (but not randomly), this constitutes quota sample. The main difference between quota sampling and proportionate stratified random sampling is that in the former the final selection of individuals, is not random, whereas in the latter the final selection of individuals is random. This method is convenient, less costly and can include the individuals from different strata of population. But quota sampling being a non-random, potentially biased sampling method, can lead to large sampling error.

2. Purposive sampling

It is also a non-random sampling method in which the sample is arbitrarily selected because characteristics which they possess are deemed important for the research. In purposive sampling, the investigator has some belief that the sample being selected is typical of the population or is a very good representative of the population. This is also known as judgement sampling or studying attitude of the people towards the national issues, a sample of journalists, teachers and legislators may be chosen, which is an example of purposive sampling. This method ensures that those individuals will be included in the sample that are relevant to the research

design. Because of limitations of time and money, purposive sampling is a popular method for student research project.

3. Systematic sampling

This is a non-random sampling method in which every n^{th} element is chosen from a list of numbered elements. Thus, every element does not have a chance of being drawn once the starting point is selected. The starting point is often chosen randomly and sometimes changed several times during the selection process to improve the chances of representativeness, especially in ordered list. Selecting every 7^{th} roll number in a class of 70 students, drawing every 5th name from a telephone directory constitute examples of systematic sampling. This method is easier, faster and less expensive to carry out, particularly with a large population. But it is potentially a biased sampling method. Bias and consequent misleading conclusions are particularly likely if lists are ordered on some large to small character or vice-versa, or there is periodicity i.e. sampling a particular day over several weeks. In selecting every 10^{th} name in a list once the starting point is selected, every 10^{th} name has a 100 percent probability of being selected, whereas the nine names in between have zero probability of being selected.

4. Snowball sampling

This is essentially a sociometric sampling technique for study of small groups. All the persons in a group or organization identify their friends, who in turn identify their friends and associates, until the informal relationships converge into some type of a definite social pattern. The method is suitable for study of social change, diffusion of information, network analysis, decision-making, etc. among specific segments of society or social organizations. The method is convenient for a small sample.

5. Double sampling

Double sampling is defined as drawing a small sample of individuals from a bigger sample of them. For example, the researcher wants to study the knowledge of newly married couples about family planning through mailed questionnaire. For this purpose, a questionnaire is mailed to one thousand couples residing in different localities. Only 50 percent, that is 500 questionnaires are returned. From these 500 persons the researcher draws a random sample of 100 and mails another set of questionnaire to get their in-depth knowledge about family planning. This method is known as double sampling. This method has the disadvantage of taking much time and labour of the researcher.

6.5.5 Sampling and Non-sampling Error

In the selection of a sample, and collection and analysis of data, two types of error generally creep in. They are categorized as sampling error and non-sampling error.

A. Sampling Errors

The errors which arise due to the use of sampling surveys are known as the sampling errors. Even when a sample is random one, it may not be exactly representative of the population from which it is chosen. This is because samples are seldom, if ever, perfect miniature of the populations. However these errors can be controlled. Sampling errors are of two types- biased and unbiased.

1. Biased errors

Biased errors are those which arise as a result of any bias e.g. prejudice of the person in selecting a particular sampling method. For example, purposive sampling method may be adopted in place of a simple random sampling method. As a result of such a selection, some errors are bound to arise, and they are known as biased sampling errors, or cumulative errors or non-compensating errors. As bias or prejudice forms a constant component of error that does not decrease as the number in the sample increases. Instead such errors are likely to increase with an increase in the size of the same.

Bias may arise due to (i) faulty process of selection, (ii) faulty work during the collection of information, and (iii) faulty method of analysis. Faulty selection of the sample may give rise to bias in a number of ways, such as: (a) purposive sampling (b) selection of sample in a haphazard way (c) substitution of the selected item in the sample by another (d) incomplete investigation or response, etc. During the process of collecting the actual information in a survey (whether sample or census), certain inaccuracies may creep in. These may arise due to the improper formulation of the problem, wrongly defining the population, specifying wrong decision, securing an inadequate frame, poorly designed questionnaire, an ill-trained interviewer, failure of a respondent's memory, unorganized collection procedure, faulty editing or coding of response and so on. Faulty methods of analysis may also introduce bias. Such bias can be avoided by adopting the proper methods of analysis. Biased sampling errors can be measured and controlled to some extent.

2. Unbiased errors

Unbiased errors arise due to chance factors between the members of the population included in the sample and those not included. It is known as random sampling error. The random sampling error decreases on an average as the sample increases. Such error is, therefore, also known as non-cumulative or compensating error. Unbiased sampling errors can be statistically measured and controlled.

B. Non-Sampling Errors

Non-sampling errors are errors not connected to sampling. This type of error can occur in any survey, whether it be a complete enumeration or sampling. Non-sampling errors include biases and mistakes. Biases are deliberate while mistakes are not random. Mistakes result from inefficiency. Some of the factors responsible for the non-sampling errors are enumerated here. Vague definition of population,

vague questionnaire, vague conception regarding the information desired, inappropriate statistical unit, inaccurate/inappropriate methods of interview, observation or measurement, errors in data processing operations such as coding, punching, verification, tabulation etc. and errors committed during presentation and printing of tabulated results.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

3. What are the essentials of a good sample?

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4. What are the advantages and disadvantages of sampling?

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6.6 LET US SUM UP

In this unit you have learnt the procedure to evaluate a problem, meaning and definition of hypothesis, need of hypothesis, principles of stating hypothesis, and formulating types of hypothesis. You have also learnt meaning and definition of sampling, essentials of a good sample, advantages and disadvantages of sampling, types of sample design-techniques and sampling and non-sampling error.

6.7 UNIT-END EXERCISES

1. Why does a researcher need hypothesis?
2. What are the principles of stating hypothesis?
3. Explain the types of hypothesis.
4. What is sampling?
5. Describe the types of sampling techniques.
6. Write a note on non-sampling error.

6.8 ANSWER TO CHECK YOUR PROGRESS

1. Hypothesis

John W. Best defines hypothesis that "It is a shrewd guess or inference that is formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigation."

According to Creswell "Hypothesis is a formal statement that presents the expected relationship between an independent and dependent variable."

2. The following questions to be asked while selecting a research problem

1. Is it interesting? For, if it seems dull and boring to the research worker, there is little hope that he would do justice to it.
2. Is it new? For, if it has been already tackled by some previous researcher, then the duplication of effort would be a sheer waste.
3. Is it significant? For, if it is not worthwhile, if it neither adds to knowledge nor leads to any improvement in the current practices, it would be in vain.
4. Is it feasible? For, a problem may be interesting, significant and new and yet not be a good problem for a particular research worker and he may fail to carry it through to a successful conclusion.

3. Essentials of a Good Sample

1. Representativeness

Representativeness of the population by the sample must be ensured before further pursuit is made in the course of research. The sample must be representative of the population. Usually any random sample, because of the operation of the principles of statistical regularity and inertia of large numbers, is representative of the population.

2. Appropriate Size

The sample size should be appropriate neither too large nor too small. Larger the sample higher the accuracy and vice versa. But mere size does not ensure accuracy. Appropriate stratification, due proportioning of sample across different strata and such other scientific methods ensure accuracy. It is better, at least the sample is statistically larger, i.e equal to or greater than 30.

3. Goal Orientation

The sample must reflect the goal of the research. If the researcher's goal is just formulation of hypothesis, a less exact sampling exercise may be enough. If the goal is testing of hypothesis a higher exactness is needed in the sampling exercise. If the purpose is estimating population parameter, still higher exactness is needed in the scheme of sampling.

4. Measurability

The sample must help measuring sampling error from sample results. We know sampling error of mean is = $\sigma/\sqrt{n}$; sampling error of proportion is: $\sqrt{pq/n}$ and so on, where, 'σ' is population standard deviation, p = population success proportion, n = sample size. To ensure measurability of sampling error, random sampling need to be adopted.

5. Practicability

A sample must be capable of being practised. The size, the composition of sample elements, the location of the sample elements, etc. must permit contacting them and getting the responses. About 2.5 mn foreign tourists visited India in 2001. Even 1% of tourists means a size of 25000 tourists. Is it possible to meet and collect data from this large number of the sample units? Most of them had already returned home. How can we elicit views from them? These are the impracticability a sample design must avoid.

6. Economical

One of the main reasons for use of sample studies is the economical or inexpensiveness of this method. So, a sample must be economical to the research firm for contact and collection.

4. Advantages and Disadvantages of Sampling

Advantages

- Economical: significantly less costly than the entire population.
- Increased speed: Less time-consuming than the population to collect, analyze and interpret data.
- Greater scope: easier data handling and management, comprehensive scope and flexibility.
- Accuracy: accurate and complete studies, authentic results of the analysis, possibility of drawing valid inferences or generalizations.
- Practical method: very practical method when the population is infinite.
- Rapport: establishes adequate rapport with the respondents.

Disadvantages

- Biased: possibility of biased selection resulting in erroneous conclusions.
- Difficulty in selecting truly a representative sample: difficult to select a truly representative sample for complex topics.
- Need for subject-specific knowledge: possibility of serious mistakes due to limited knowledge, training and experience of researcher in sampling theory.
- Changeability of sampling units: unscientific method for heterogeneous units of population.
- Impossibility of sampling: impossible to select a representative sample in case of small or too - heterogeneous population.

6.9 SUGGESTED READINGS

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UNIT-VII METHODS TO STUDY CHILDREN-I

Structure

7.1 INTRODUCTION

Observation is a primary tool of scientific enquiry. It is increasingly employed in social science research as in physical and natural science researches. For instance, the anthropologists observe the activities, folk ways, modes of tribal people, psychologists observe the psychological behaviour of infants and adults, sociologists observe various aspects of a community, and educationists observe the social situation, teacher pupil interaction within the class room and teacher effectiveness. Observation gives an opportunity for direct first-hand knowledge and authentic picture about the social phenomena. But it must be clearly understood that it is supplementary to other methods and techniques of scientific enquiries as it is sometimes only through direct observation certain types of data can be obtained. This unit deals with meaning and definition of observation, steps for observation, aspects of observation and types of observation.

7.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of observation
- Define the term observation
- Understand the steps for observation

- Describe the types of observation
- List out the advantages and limitations of observation

7.3 OBSERVATION

Observation is a very important faculty of human being through which we gain on understanding of human action. It is a method for researchers to fathom human behaviour. It becomes a scientific tool to the extent that it serves a formulated research purpose, is planned systematically, is related to more general theoretical propositions, recorded systematically and is subjected to checks and controls on validity and reliability.

7.3.1 Meaning and Definition

Observation method is one of the commonly used method of data collection. Observation is the process in which one or more persons observe what is occurring in some real-life situation and they classify and record pertinent happenings according to some planned scheme. This method is used to evaluate observable behaviour both in a controlled and uncontrolled situations

The Concise Oxford Dictionary defines observation as `accurate watching and noting of phenomenon as they occur in nature with regard to cause and effect or mutual relations. Simply, it means the careful and systematic watching of facts as they occur in course of nature. In the strict sense, observation implies more use of the eyes and the ears than the mouth.

The field work aims at a thorough and systematic collection, classification and reporting of events as well as the specifications of relations between those events. By employing sociological concepts and propositions to order collected data, researchers try to illuminate the less visible, latent structure of social organisation. Successful researchers do break false formulae that earlier observers have constructed to account for social labels, stereotypes, cultural taboos, fear, ignorance, indifference, or avoidance. And in so doing, observational researchers give as, a fresh perspective on our own social positions. All these related aims of observational field research provide us the criteria according to which such research ought to be evaluated.

7.3.2 Steps for Observation

In order to obtain valid and reliable data through an observation procedure the researcher must follow the following steps.

1. Planning for the observation

At this stage the researcher must define the specific activities to be observed. The units of behaviour to be observed must be decided. The researcher should determine the nature of the groups of the subjects to be

observed, the scope and length of the observation. The tools to be used during the observation should also be decided at this stage.

2. Executing the observation

This is the stage when the real work of observation is done. The researcher should make arrangement of the specific conditions for the subject or subjects to be observed. He should assume the proper physical position for observing specific activities or units of behaviour under observation. At this stage the researcher has to handle the recording instruments properly.

3. Recording the observation

Recording of the observation may be done at the time of observation or soon after the observation is over. If the recording is done at the time of observation, the observer may record it in writing or he may use some electronic medium like tape recorder, or concealed camera, one way vision screen, etc. But when the recording is made after the observation is over at that time the observer may record the facts in writing for different aspects of behaviour.

4. Interpreting the observation

The next step in observation is to interpret the observed data. It must be done without any biasness, or influence of his personal attitude and values. The emotional involvement of the observer or his selective perception may increase the subjectivity of interpretation.

7.3.3 Aspects of Observation

Observation involves three processes, i.e., (i) sensation (ii) attention (iii) perception. Sensation is gained through the sense organs which depend upon the physical alertness of the observer. The sense organs are receptive to stimuli and get attracted leading to the first stage in observation. Then comes attention or concentration which is largely a matter of commitment and will-power. Adequate training and experience can make it almost a matter of habit. The third is perception which comprises the interpretation of sensory reports. Thus, sensation merely reports the facts as observed but perception enables the mind to recognize the facts. Through this process, observation serves the purpose of (a) studying collective behaviour and complex social situations; (b) following up of individual units composing the situations; (c) understanding the whole and the parts in their interrelation; (d) getting the out of the way details of the situation.

7.4 TYPES OF OBSERVATON

As observation includes interviews, questionnaires, records etc., the place of observation may in the natural or real life setting or in a laboratory. The procedures for observation may vary from complete

flexibility to the use of pre-coded detailed formal instrument, the observer may himself participate actively in group he is observing or he may be an observer from outside or his presence may be unknown to the people he is observing. The following are some of the important types of observation.

7.4.1 Systematic Observation

Systematic observation employs standardised procedures, training of observers, schedules for recording and other devices to control the observer and sometimes even the subject. Clearly some systematisation is valuable in research observation, but the situation often limits what can be done. A systematic observation is a scientific observation too. The very word refers strict framing. The observer should be very clear of his situation under study. Based on that he should plan for making and recording observation for collection of data. The setting can be either in field or in a laboratory.

As the situation and the problem are already explicit to the observer he has to set up in advance the categories in terms of which he will analyse the situation. The categories are clearly defined to provide reliable data on the questions to be asked. It is important that the researcher decides upon an appropriate frame of reference for categorization and train observers accordingly.

In case of describing an overall nature of an event or to code certain actions of a member in a frame of reference provided by the entire event, sound recordings and motion pictures are to be used. If the data are to be used for research the data collection should be in a formal scheme, relevant categories for recording behaviour must be established, time units decided upon, methods set up for recording, who initiated an action and who was the target.

The following things to be considered when planning a systematic observation:

Equipment - is the observation going to be live, or audio/video recorded?

Reactivity - is the presence of a camera or an observer likely to influence the behaviour being observed?

Reliability - Is the coding system reliable? In systematic observation inter-rater reliability is especially important; imagine four researchers are each assigned to a six hour shift observing the behaviour of rats it would be important to training them to use the coding system, and make sure the code is clear so as to make sure they have high inter-rater reliability.

Sampling - the timing and duration of the observation is important. Any one observation allows us to observe a sample of behaviour. We will most likely see different behaviours if we observe a child in the classroom versus observing them at home, and in the classroom we are likely to see different behaviours if we observe a child during free-time, versus a group activity, versus when the teacher is reading a story to the class. The

appropriate sample for the observer depends on what her purpose is. The best sample depends on the frequency of the behaviour and on how variable it is across settings, and on the purposes of the researcher. If she wants to understand why a child cries at school and not at home, then she should observe the child in both settings. If the child cries twice a week she will have to observe for several days, whereas if the behaviour occurs every 10 minutes she may have sufficient information after a few hours of observation.

In spite of all the systematic scheming, it has its limitations. These are some special problems in achieving reliable and valid observations. Those are as follows:

1. The inadequate definition of the kinds of behavior that are to be accepted as corresponding to a given concept. For example, if the concept of patience was not operationally defined, observers may be inclined to different kinds of behavior as referents of the concept.
2. Even a well trained and skilled observer may slip down from his reliability in certain factors like the degree of confidence must have in one's judgment before marking a given category. The constant error introduced by the observer because of the distortion of his perceptions (for various reasons) is one of the major sources of unreliability.
3. The load of work also hamper reliability. The result is often that the observer cannot record all relevant data and may unwillingly record some aspects rather inadequately, thus introducing bias.

Yet reliability can be increased by careful training of observers. A well-developed observational procedure can be damaged by difference among different observers or by failure to understand the ruler for its use.

7.4.2 Naturalistic Observation

The unstructured observation is mostly used as a technique, the observer's understanding of the situation is likely to change as he goes along. Thus in turn, may call for changes in what he observes it is flexible; it allows for changes in focus from time to time if and when reasonable doubts defend such changes, in accordance with its importer at different points of time.

Though there is no hard and fast rule for the observer to go about, there are certain things that the observer should not overlook. They are given below:

1. The observer should see who the participants are, how many they are, and how they are related to one another.

2. The observer should understand "setting". He should know in addition to its evert appearance, the kinds of behaviour it encourages, discourages or prevents and its social characteristics.

3. The observer should also understand the purpose which has brought the subject participants together, the nature of the purpose and how the goal of participants are related.

4. The observer must also understand what the participants do, how, with whom and with what they do it.

5. The observer should know what stimulus initiated the behaviour, what the goal is towards which the behaviour is directed, what are the qualities of the behaviour (duration, intensity, etc.) and what are its consequences?

6. Recording an observation involves two major considerations:

i) When should the notes be taken and

ii) How the notes should be kept.

For authentic work, recording should be on the spot and during the event. To make it effective the observer can jot down everything in key words and reconstruct when he retires. The facility of recording improves if the observer evolves some kind of indexing system.

7. Ensuring the accuracy of observation is another important concern of the observer. Other than the tape recorder, two or more people can observe the same event and can compare their notes and check bias.

7.4.3 Participant and Non-participant Observation

In participant observation, the observer works his way into the group he is to observe so that, as a regular member, he is no longer regarded as an outsider against whom the group needs to guard itself. Sociological studies have been conducted in which the investigator even joined prisoners in order to understand them. In non-participant observation, the observer remains aloof from the group. He keeps his observation as inconspicuous as possible.

The observer's appearance either direct or in disguise has both, advantages and disadvantages. Entrance into a community requires a careful staging. The observer must be prepared to provide a convincing reason for his presence in the community.

Advantages of Observation

1. Observation helps the researcher to collect data where and when an event or activity is occurring.

2. There are many facts worth recording are so much taken for granted by the native people that they are not thought to be worthy of reporting. Such behaviours' true picture can be studied by observational technique.

3. Studies may deal with subjects who are not capable of giving verbal reports of their behaviour or feelings for the plain reason that they cannot speak, e.g. infants or animals. Such studies necessarily depend on observation.

4. Observations may enable the researcher see things that are taken for granted by participants in the teaching-learning process.

5. The method does not rely on people's willingness or ability to provide information.

6. It permits the researcher to directly see what people do rather than relying on what people say they did.

7. It provides good insights into how different participants are behaving and interacting.

4. Observation is independent of people's willingness to report. People may not have the time or they may be unwilling to be interviewed or tested, observation can overcome such resistance.

Limitations of Observation

1. Because of the unforeseen factors' interference with the observational task, may disturb even the observation of regular daily occurrences.
2. The practical possibility of applying technique is limited by the duration of events. For instance life histories cannot be obtained their way. Moreover private behaviors are rarely accessible.
3. It can be time-consuming.
4. It may affect the behaviour of those involved in it and hence what you observe.
5. The thinking that underlies participants' observed actions could not be observed.
6. It does not increase our understanding of why people behave as they do.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. What is observation?

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2. Explain the steps for observation.

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7.5 LET US SUM UP

In this unit you have learnt meaning and definition of observation, steps for observation, aspects of observation, types of observation like systematic observation, naturalistic observation, participant and non-participant observation. You have also learnt advantages and limitations of observation.

7.6 UNIT-END EXERCISES

1. Discuss various types of observation.
2. What are the advantages and limitations of observation?

7.7 ANSWER TO CHECK YOUR PROGRESS

1. Observation

The Concise Oxford Dictionary defines observation as `accurate watching and noting of phenomenon as they occur in nature with regard to cause and effect or mutual relations. Simply, it means the careful and systematic watching of facts as they occur in course of nature. In the strict sense, observation implies more use of the eyes and the ears than the mouth.

2. Steps for Observation

In order to obtain valid and reliable data through an observation procedure the researcher must follow the following steps.

1. Planning for the observation

At this stage the researcher must define the specific activities to be observed. The units of behaviour to be observed must be decided. The researcher should determine the nature of the groups of the subjects to be observed, the scope and length of the observation. The tools to be used during the observation should also be decided at this stage.

2. Executing the observation

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3. Recording the observation

Recording of the observation may be done at the time of observation or soon after the observation is over. If the recording is done at the time of observation, the observer may record it in writing or he may use

some electronic medium like tape recorder, or concealed camera, one way vision screen etc. But when the recording is made after the observation is over at that time the observer may record the facts in writing for different aspects of behaviour.

4. Interpreting the observation

The next step in observation is to interpret the observed data. It must be done without any biasness, or influence of his personal attitude and values. The emotional involvement of the observer or his selective perception may increase the subjectivity of interpretation.

7.8 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
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UNIT-VIII METHODS TO STUDY CHILDREN-II

Structure

8.1 INTRODUCTION

There are various methods to study children. These methods are used to collect data which helps to study the children. Data collection is one of the important steps in the research process. The validity of the research depends upon the accuracy of the data collected. The accuracy of the data depends upon the tools and techniques used for the purpose. If the data collected is erroneous then inferences made out of these data will also be erroneous. Therefore, a researcher should be well acquainted with the techniques to use those tools to be used for data collection. This unit deals with clinical interview, structural interview, questionnaire, psychological test, case study and ethnography and finally deals with construction and standardization of research tools.

8.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of interview
- Understand the interview techniques
- Know the meaning of questionnaire
- Discuss the advantages and limitations of questionnaire

- Know various psychological tests
- Enlist the steps in case study
- Know the advantages and disadvantages of ethnography
- Narrate the steps in construction and standardization of a research tool

8.3 SELF-REPORTS

In self-reports,clinical interview, structural interview, questionnaire and psychological test are presented.

Before entering into the topic clinical interview, it is better to have an idea about meaning of interview, pre-requisites of interview and techniques of interview.

Interview is one of the popular methods of data collection. The term interview can be dissected into two terms as, 'inter' and 'view'. The essence of interview is that one mind tries to read the other. Interview must be combined with a schedule. In other words, interview is a technique where the interviewer tries to assess the interviewed in terms of the aspects studied or issues analyzed.

Interview is essentially the oral, in person administration of a questionnaire to each member of sample in this process of communication or interaction in which the subject or interviewer gives the needed information verbally in a face-to-face situation. In this process the interviewer can observe certain aspects of a person's behaviour, such as his manner of speaking, his poise, his tendency to be outgoing or withdrawn, or his tenseness about certain topics.

Pre-requisites for Successful Interview

1. Proper study design.
2. An art - to get reliable and valid data.
3. Friendly atmosphere - to ease the atmosphere.
4. The interviewer to answer legitimate question and to clear any doubt the respondent has.
5. The interviewer should not show any surprise or disposition discouraging irrelevant conversation and trying to keep the respondent on his track.
6. He has to use mnemonics to note down or record at once without disturbing the oral interview.

Interviewing Techniques

Interviewing in itself is an art. If it is done with care it can elicit valid and reliable data. The following techniques enable the researcher in conducting interview successfully.

(a) Preparing for interview

In order to obtain valid information the interview must be planned before hand. The researcher should decide which type of interview will be suitable to the nature of the data required. Whether it will be structured or unstructured the researcher should also decide the procedure of recording the interview. If required a try out may be done. The interviewer should also plan the questions fit for eliciting the desired data.

(b) Conducting the interview

Report is the most essential element of interview. So first of all the researcher should establish good rapport with interviewee so that the interviewee feels comfortable in revealing his feelings. The researcher should behave in a friendly manner with the interviewee. Turny B. and R, George have suggested the following techniques of interviewing

1. Ask only one question at a time.
2. Repeat a question, if necessary.
3. Try to make sure that the subject understands the question.
4. Listen carefully to the subject's answer.
5. Observe the facial expressions, gestures and tone of voice of the subject.
6. Allow the subject sufficient time to answer the questions.
7. Do not suggest answer to the questions.
8. Do not show signs of surprise, shock, anger, or other emotions if unexpected answers are given.
9. Maintain a neutral attitude with respect to controversial issues.
10. Take note of answers that seem to be vague, ambiguous, or evasive.
11. Ask additional questions to follow up clues or to obtain additional information in unstructured interview.
12. Use tack and skill in getting the subject back to an area of inquiry when he stays too far from the original questions.

(c) Recording the interview

It is the third important aspect in interviewing. The researcher may use a schedule or a voice recording device like tape recorder or micro-phone or a video camera. These electronic devices eliminate omissions, distortions, elaborations. It also provides an opportunity to evaluate the gestures and facial expressions of the interviewer. But when these devices are not available the researcher may take the note of the data. Knowledge of stenography helps the researcher in this situation.

8.3.1 Clinical Interview and Structural Interview

G.W. Allport says, "If you want to know how people feel, what they experience and what they remember, what their emotions and motives are like, and the reasons for acting as they do why not ask them?" The interview method is quite effective in giving information about person's perceptions, beliefs, feelings, motivations, anticipations, future plans, past and private behaviours. Interview is one of the most commonly used

techniques (usually employed with other techniques of data collection but also on occasions, singly) of data collection in studies of human behaviour.

Clinical Interview

Clinical interview is concerned with broad underlying feelings or motivations or with the course of individual's life experience, rather than with the effects of the specific experience. Here the interviewer knows in advance what aspects of feeling or experience he wants the respondent to talk about. But the method of eliciting information is more or less completely left to his discretion. The most common types of clinical interviews are those conducted during social case work, in psychiatric clinics and in prison administration.

Values and Uses

l. The personal interviews, compared especially to questionnaires, usually yield a high percentage of returns.

2. Comparison with questionnaires and observational tools, here everyone can be reached by and can respond to this approach.

3. The information secured is likely to be more correct compared to that secured through other techniques, there is chance of verification of replies.

4. For clear authentic study, the interviewer can collect supplementary information about the informants' personal characteristics and environment which is of great value in interpreting the results.

5. Facial expressions and gestures of the informants helps the interviewer to evaluate the meaning of the verbal replies given by informants.

6. The interviewer can visit repeatedly to complete items on the schedule or to correct mistakes, without annoying the informant.

7. The interviewer acts as a catalyst, Face-to-face contact provides enough stimulation to the respondent to probe deeper within himself. Moreover the most spontaneous reactions can be recorded.

8. There is control over the interviewee. The interviewer can usually control which person or persons will answer the question. If so desired group discussions may also be held.

9. Other than flexibility, the interview method helps the interviewer to adjust according to the mood of the interviewee, and he can handle delicate situations more effectively.

10. The language of the interview can be adopted to the ability or educational level of the person interviewed. Therefore, it is comparatively easy to avoid interpretations or misleading questions.

11. The interview is a more appropriate technique for revealing information about complex emotionally - laden subjects or for probing the sentiments underlying an expressed opinion.

Limitations

1. In terms of cost, energy and time the interview approach poses a heavy demand. The transportation cost and the time required to cover addresses in a large area as also possibility of non-availability or 'not at home', may make the interview method uneconomical and often inoperable.

2. The efficacy of interviews depends on a thorough training and skill of interviewers as also on a rigorous supervision over them. Failing this, data recorded may be inaccurate and incomplete.

3. The human equation may distort the returns. If an interviewer has a certain bias, he may unconsciously devise questions so as to secure confirmation of his views.
4. The presence of the interviewer on the spot may overstimulate the respondent, sometimes even to the extent that he may give imaginary information just to make it interesting. On the other hand the respondent may hesitate to give correct answers for the fear that it would adversely affect his image. Some fear of this information being used against him may grip him.
5. In this interview tool, the organization required for selecting, training and supervising a field staff is more complex.
6. Effective interview presupposes proper rapport with the respondent and controlling of interview - atmosphere in a manner that would facilitate free and frank responses. This often a very difficult requirement, it needs time, skills and often resources. Secondly, it is not always possible for the interviewer to judge whether the interview atmosphere is, how it should ideally be and whether or not 'support' has been established.

Structural Interview

In a structured interview the interviewer follows a predetermined plan of questioning. For this he may use either a checklist or a list of questions. In this type of interview desired data can be collected without omitting anything. Such interviews involve these of a set of pre-determined questions and of highly standardized techniques of recording. The reason for standardization is to make easier that all respondents reply to the same questions; that is, any given questions has the same meaning for all the respondents. Generally the questions are of fixed and alternative patterns. The alternative questions or closed ended questions are those in which the response of the subjects are limited to fixed, pre-designated alternatives. These alternatives may simply be 'yes' or 'no' or may consist of a series of replies out of which the respondent picks any one which is closest to his position. There may be open-ended questions but the questions and the order are pre-determined. The interviewer, however free to repeat the question if the reply is not to the point.

Merits

1. There is comparability of interview records.
2. There is uniformity which facilitates bringing these different records into a single conceptual scheme affording a safe basis for generalization.
3. Being more economical, structured interviews afford a larger coverage in terms of respondents.
4. It demands minimum number of skills on the part of the interviewer.

8.3.2 QUESTIONNAIRE

A questionnaire consists of a number of questions printed (or typed) in a definite order on a form (or set of forms). The forms are usually mailed to the respondents who are expected to read and understand the questions and reply to them in writing in the relevant spaces provided for the purpose on the said forms. Ideally, the respondent has to answer the questions on his own, i.e., totally unaided. A schedule also has a reference to proforma containing a set of questions. The researcher i.e. interviewer

puts to respondents the questions from the proforma in the order these are listed and records their replies to them. In certain situations, the schedules may be handed over to the respondents and the interviewer may get these filled in his presence, offering necessary explanations with reference to the questions if and when necessary.

Questionnaire Construction

The investigator should first discover the available data in hand and must decide whether he could collect all the expected details through questionnaire. Then he has to follow the following steps in order to set a good questionnaire.

1. Information to be sought.
2. Type of questionnaire to be used.
3. Writing a first draft.
4. Re-examining and revising questions.
5. Pre-testing and editing the questionnaire.
6. Specifying procedure for its use.

1. The formulation of the problem provides the starting point for developing the questionnaire. The investigator must decide what aspects of the problem are to be dealt with in a particular study.
2. The appropriate form of question depends on the mode of administration, the nature of information sought, the sample of people and the kind of analysis and interpretation intended. The investigator must also decide whether to use closed or open-ended questions. The use of follow-up questions or probes is advisable at many points in connection especially with free responses. The questionnaire should anticipate when these are required and should provide the appropriate wording.
3. While framing the questions, the best sequence of topics should be carefully considered. To check reliability and consistency closely related questions may be asked.
4. The questionnaire should be scrutinized for technical defects other than biases and blind spits arising due to personal value.
5. Before launching the questionnaire pretesting is necessary. If substantial changes are warranted, a second pre-test may be conducted. After pre-testing, the final editing is done to ensure that every element passes scrutiny; the content, the form and sequence of questions, the speeding and arrangement. Editing intended to make the questionnaire as clear and easy to use as possible.
6. The questionnaire itself should contain simply, straightword directions, indicating just what the respondent is supposed to do.

Type of Questionnaire

Standardized questionnaires may differ in the amount of structuring of the questions used. They may present fixed alternative answers to questions so the respondent just chooses the appropriate one, or they may leave the respondent free to answer in his own words.

Closed Form or Closed-end Questionnaire

Questionnaires that call for short, check responses are known as the restricted or closed-form type. They provide for making a yes or no, a short

responses, or checking on item from a list of suggested responses. The following example illustrates the closed form item:

Why did you choose to do your post graduate work at this university?

a) Convenience of transportation b) Advice of a friend c) Reputation of institution d) Scholarship aid e) This is the only institution.

Advantages

The following are the advantages of closed-end questionnaire:

1. Fixed / alternative or closed questions have the advantage of being standizable.
2. It is easier and quicker for respondents to answer.
3. They are simple to administer, quick and relatively inexpensive to analyse.
4. Responses of different respondents are easier to compare.
5. Response choices can clarify question meaning for informants.
6. Respondents are more likely to answer about sensitive questions.
7. Respondent is restricted to a finite set of responses.
8. It is ideal for quantitative type of research.

Limitations

The following are the limitations of closed-end questionnaire:

1. Respondents with no opinion or no knowledge can answer anyway.
2. Respondents can be frustrated because their desired answer is not a choice.
3. It leads to confusion if many response choices are offered.
4. Misinterpretation of a question can go unnoticed.
5. There is possible to marking wrong response.
6. They force respondents to give simplistic responses to complex issues.
7. They force respondents to make choices they would not make in the real world.

Open Form or Open-end Questionnaire

The open form or unrestricted type of questionnaire calls for a free response in the respondent's own words. The following open form item seeks the same type of information as the previous closed form item:

Why did you choose to take your post graduate work at this university?

Many questionnaires include both closed and open items, each type has its merits and limitations and the questionnaire builder must decide which type is more likely to supply the information he or she wants.

Advantages

The following are the advantages of open-end questionnaire:

- It provides detailed responses from the audience.
- The investigator bias is minimized because the investigator does not propose the options and the respondents decide themselves.
- The respondents can express themselves freely when they are asked open-ended questions.

Limitations

The following are the limitations of open-end questionnaire:

- The analysis of responses to open-ended questions is often complex, difficult, and expensive.

- It requires knowledge and skill to analyze these answers and take meaningful notes from the responses.
- In analyzing the open-ended questions the researcher bias can be introduced because he has to analyze these answers in his own way.
- Respondents provide detailed answers that have no relevance to the questions asked such information is useless to the researcher.
- Some respondents find it difficult to give detailed answers and they leave questions unanswered.
- Respondent bias can also be introduced if the person answering the question has biases about the topic.

8.3.3 Psychological Test

There are the tools that help to diagnose an individuals on a particular purpose. These assessment help individuals to approve their existing level of psychological trait, to identity the cause for the effect and to assess the impact of the needed programme if any. If a child's behaviour is in a particular undesirable way, parents, teachers, counsellers should identity and diagnose the causes to constitute remedial programmes. For example, parents could be assessed either through testing or non-testing resources. The attitude scale, TAT Research, Rating scale are some of the testing tehniques.

Situational Tests

Situational tests are used to assess ingenuity, emotional stability and / leadership among young men. "Brook Test" is an example for such test. In this test, men are taken in groups of four to seven, to a brook, which is regarded as a raging torrent, so fast and so deep that nothing can be rested on the bottom. Under unarranged specific circumstances, the individual may be observed in his day-to-day life. He can be studied continuously or at particular circumstances. If the examiner is interested in assessing the social relations of the individual, he may observe the individual when he is interacting with others.

Behaviour Change

Social learning theorists are interested in assessing the personality, mainly for the purpose of behaviour change. They are focusing their attention on the variables which are relevant to behaviour and possibilities for modifying that behavior. A few among those variables are i) Specific behaviour Pattern ii) Stimulus conditions that control that pattern iii) Response capabilities and iv) The degree and type of self reinforcement that the individual uses.

Behaviour can be observed directly in naturalistic settings. For example, children can be observed in a nursery school setting; notes can be taken on the number of aggressive responses displayed and also on the conditions that solicited those responses.

Rating Scales

In rating scales, the most common pattern of rating procedure presents the rater with a sort of trait names. The trait names may be further defined in operational terms, with a range of numbers or descriptions or adjectives. The rater is, then, expected to assign a number or a description or an adjective against each trait or function.

Letters of recommendations, character certificates and testimonials are crude rating scales.

Personality Inventories

"Personality Inventory" is a tool in printed form. It contains statements, questions or adjectives, which apply to human behaviour. The inventories are administered to the subjects. They need to indicate their reactions to the various items of the inventory. Their reactions are then, scored and evaluated in terms of percentiles or other statistical norms.

Minnesota Multiphasic Personality Inventory, which is often referred to as MMPI, is a widely used inventory. Normally, this inventory contains 550 statements. The subject (examinee) reacts to each of these statements. He has to decide whether the statements applies to him or not. If he considers the statement true, he can register his response as 'True". At the sametime, if he does not know anything about the statement, he may very well register his response as "cannot say".

Projective Techniques

The projective techniques are the most intriguing and the least understood of all personality tests. The term "Projective" refers to situations, where the individual, in question, attributes or "Projects" his own traits or feelings to other persons or even to inanimate objects. In other words, the subject's response to these nebulous situations is presumed to arise largely from within him, rather than from the external stimulus. Hence, these projective techniques are expected to have little structure.

Special Features of Projective Techniques

Projective techniques are presumed to reveal the less conscious but control aspects of personality. The unstructured nature of these techniques has privilege of eliciting unconscious motivations, inner fears and hidden desires of the individual.

Projective techniques center on Psycho-Analytic Approach. "Personality" is a wider comprehensive term and it includes within its range the unconscious "drives" or "motives". The major aim of the projective tests is to bring out these motives to limelight for the purpose of a thorough assessment of the "personality".

An illustration is given below:

If an incomplete statement "the main driving force in life is given to subjects, one person may complete this sentence with a response "to achieve security" and another person with a response "power and prestige" and yet another person with "sex". Even if the respondent refuses to answer, such responses rather reveals more about his innerself, than a stereotyped answer.

In addition to that, a projective test presents an ambiguous stimulus to which the individual may respond as he wishes theoretically, when the stimulus is ambiguous and does not impose a demand for a specific response from the individual, he unconsciously "projects" or reveals his inner-self through his responses, just like a movie or a camera projects an image on the screen.

The most widely used projective techniques are Thematic Apperception Test and the Rorschach Test.

i) Thematic Apperception Test

When we perceive a situation largely in terms of our past experience rather than in terms of what is immediately before us, we are said to be "apperceiving".

The assumption underlying the Thematic Apperception Test is that the meaning one attributes, while perceiving a picture, reveals something of his past experience, feelings, attitudes and motives.

When a TAT is administrated, the subject is presented with a series of ambiguous pictures. He is asked to make up a story for each picture. The themes in these stories are likely to involve conflict, affection, fear, contentment or dissatisfaction, achievement and so on. The subjects need to determine the theme and the underlying concerns of the stories.

ii) Rorschach test

This test involves ten cards, which, inturn, contain inkblots. The cards are shown to the subject one at a time, in a prescribed order. The subject is asked to come out with his opinions on the cards or to state whatever those cards bring to his mind.

This test provides the subject with as much freedom as possible. For instance, he may wish to alter the position of the cards or, at times, he may wish to see more than one card at a time. Whatever be his wish, he may be allowed to act freely in accordance with his whims and fancies.

Another aspect of the Rorschach test is the subject's task to answer the questions posed by the examiner, with regard to, the results obtained, during the free association session. Though this phase of the test may puzzle the subject, it is considered to be the essential part of the test procedure.

When properly administered and skillfully interpreted, the Rorschach test provides the examiner with helpful clinical information about the real nature of the subject and about his personality with all its dimensions.

8.4 CLINICAL METHOD

8.4.1 Case Study Method

Case study methods is one of the important methods in social sciences. It is also called as a traditional method of quantitative research. It is a valuable method for obtaining a true and comprehensive picture of individuality. Moreover it is also a method to explore and analyze social units like an institution or a community. The main focus is to find out the factors that account for the behaviour patterns of the given unit and its relationships with the environment.

It is a longitudinal approach showing development over a period of time. It analyses the present status, probs deeply into it and studies the influences and growth. After proking deeply into the factors and forces that condition its behaviour, it analyses the sequences and interrelationships of those factors. After that one can construct a comprehensive integrated picture of the unit as its functions in society.

Steps of the Case Study

As a scientific technique, the case study must essentially follow the methods followed by the other research methods. They are given below:

1. Selection of the cases

The selection of the cases which exemplify the problem area under investigation is obviously the first step of this study is time consuming and costly, investigation has to be restricted to few cases.

2. Determining status of the phenomenon

Either by direct observation or measurement, the status of the phenomenon under investigation must be determined.

3. Formulation of hypothesis

The investigator will formulate a relative hypothesis which will guide him for data collection on the individual cases.

4. Collection of data

The investigator collects what appears to be relevant data, observes behaviour, and administers tests. Data collection involves the use of observation, interviews, tests and other data gathering devices and techniques designed to provide information on the individual's life history, his health history, his scholastic history, his home and community background and any other aspect of the situation that might clarify the present problem. This information will have to be checked for accuracy.

5. Tentative diagnosis

The investigator evaluates the data collected, compares data with past experiences and norms and reaches a decision that not all is well. He seeks the conditions leading to or accompanying the inadequacy. From these circumstances and conditions he selects a supposed cause or causes.

6. Instituting remedy

The investigator re-examines his own past experience and scientific investigations for ideas relation to a course of action. He institutes a treatment programme accordingly.

7. Follow up or rechecking

This constitutes a test of the validity of the diagnosis. A recheck is employed to determine adequacy of behaviour performance or output. It involves remeasurement of the phenomenon under investigation to ascertain what changes, if any, have been produced into status by the modification made. If the change is a positive one, and in an amount thought significant then the diagnosis can be judged correct.

Characteristics of a Good Case Study

1. It should be based on adequate and complete data.
2. Its data should be valid.
3. It should have continuity about it.
4. Its records should be kept confidential.
5. Its data should be scientifically synthesised and this synthesis should be as much prognostic as diagnostic.
6. Its follow up work should be undertaken.

Advantages of Case Study Method

1. It has been considered as a mode of investigation in complex phenomena with casual relationships.
2. It has been frequently employed in education in studying problem cases, maladjusted pupils and scholarship difficulties.

3. It is also useful in studying the general characteristics of phenomena of any class. For instance we can have case studies of truants in a backward area, the learning condition of children of illiterates, the reasons for thumb sucking even at the age of 6, etc.
4. This study method is not only used for problems, but also (to find out the causes behind) to the investigation of normal or gifted children, successful institutions, ideal teachers and ideal children.
5. The findings of case studies form the basis of guidance in preventing maladjustment.

Limitations of Case Study Method

1. Generalization of a case or few cannot be applicable to all cases in population.
2. The selection of a subject or a unit is also a difficult one to take it as representative or typical.
3. Receiving data from records and documents may not be a true one always. There are chances for faulty memory, deliberate deception, unconscious bias, the subjects desire to present the right answer, and the tendency to overemphasize unusual events or to distort them for dramatic effect.
4. To be effective, the investigator needs familiarity with existing theoretical knowledge of the field of inquiry, and skillful in isolating the significant variables from many that are irrelevant.
5. Subjective bias is a constant threat to objective data gathering and analysis. His preconceived convictions may lead to the researcher to an unwarranted feeling of certainty about the validity of his conclusions.
6. Effects may be wrongly attributed to factors that are merely associated rather than cause and effect related. The case study process is susceptible to this post hoc fallacy.

8.5 ETHNOGRAPHY

This method was designed by anthropologists. Hence it is called as 'Anthropological Field Study approach'. This method helps to have an in-depth analytical description of a culture. Anthropologists generally employ total participant observation. But in this research method both participant and non-participant observations are employed. The investigator observes every event and record but his observation is only for a shorter time, while anthropologists do it for a longer time in continuity.

In all observations, the researcher starts with a hypothesis or set of hypotheses, design an observation system, collects information, analyses data and concludes. But the ethnographer instead of proceeding with hypotheses, approaches and observes without any preconceived notion, forms a conceptual framework and then frames hypotheses. He always believes in generating data from the overall social milieu, instead of focusing on individual. He never attempts to study an individual outside the context of the social cultural setting. This method generates hypothesis after observation, teşts the hypotheses after observation either through correlational or experimental methods.

Advantages and Disadvantages of Ethnographic Method

Borg and gall (1983) outline the following advantages and disadvantages of ethnographic method:

Advantages

1. Providing and studying about the complete picture of environment, thus enabling the researcher to give a longitudinal perspective.
2. Develops a conceptual base for generating hypotheses.
3. Gathers data in naturalistic setting.

Disadvantages

1. It is very difficult to employ those who have mastered in observation techniques.
2. It is difficult to extend the span of study for a longer time to ensure continuous objective observation.
3. The observational records could not be easily quantified and interpreted.
4. Observers' biases and preconceived notions may affect the validity of observation.
5. Recording and observing everything in a total environment may not be possible in all occasions.

8.6 CONSTRUCTION AND STANDARDIZATION OF RESEARCH TOOLS

The following are the brief procedures to be followed for construction and standardization of research tools:

1. Preparation of items for the Research Tool

Pre-try out

In this stage a researcher has to prepare number of related items representing the study with the consultation of the research supervisor (if any) and experts in the field. The prepared items will be issued to the target group to get clarity and refinement of the tool for the final study. The initial tool in English and Tamil versions (if needed) of items will be administered for substitution of vocabulary and concretization of each item. The respondents' reactions will be analyzed in terms of the following criteria viz.

- Readability of the items
- Comprehensiveness of the items
- Understanding of the alternative responses
- Capability of identifying the responses.

Language corrections in terms of grammar, terms used, and presentation style employed in sentence patterns as well as alternative

responses provided will be carried out in few contexts of the items on the basis of feedback from the respondents.

2. Establishing Validity of the Research Tool

Validity

Validity is the ability of a scale or measuring instrument to measure what is intended to be measured. An assessment instrument is valid to the extent that it succeeds in measuring the characteristics under study. It should be free from bias. There are different types of validity depending on the purpose of the test.

Types of Validity

The following are some of the types of validity:

i . Face Validity is the most basic type of validity and it is associated with a highest level of subjectivity because it is not based on any scientific approach. In other words, in this case a test may be specified as valid by a researcher because it may seem as valid, without an in-depth scientific justification.

ii. Construct Validity relates to assessment of suitability of measurement tool to measure the phenomenon being studied. Application of construct validity can be effectively facilitated with the involvement of panel of 'experts' closely familiar with the measure and the phenomenon.

iii. Criterion-Related Validity involves comparison of tests results with the outcome. This specific type of validity correlates results of assessment with another criterion of assessment.

iv. Formative Validity refers to assessment of effectiveness of the measure in terms of providing information that can be used to improve specific aspects of the phenomenon.

v. Sampling Validity ensures that the area of coverage of the measure within the research area is vast. No measure is able to cover all items and elements within the phenomenon, therefore, important items and elements are selected using a specific pattern of sampling method depending on aims and objectives of the study.

3. Establishing Reliability of the Research Tool

Reliability

An assessment tool is reliable to the extent that its results are consistent over repeated administrations. Reliability is necessary condition for an instrument to be valid. Reliability is estimated using correlation coefficients (Pearson 'r') derived from various sets of test scores where the correlation coefficients range from 0.00 (no correlation) to 1.00 (perfect correlation).

Types of Reliability

i. Test-retest reliability

Test-retest reliability measures the reliability of the measure over a period of time. In social sciences, a test is administered more than one time over a period of time to check or retest its reliability. In natural sciences, the researcher conducts experiment more than one time to ascertain its reliability. The results of the tests and the inferences drawn have to be applied to natural settings, they should be reliable. This method of testing the reliability of the test is time-consuming, since the researcher has to wait for some time to re-administer the test.

ii. Parallel forms reliability

It measures the reliability of the test by administering it in two different forms. Both forms of the test measure the same variables under study, but the format of the measure is different. The researcher must be able to formulate two different tests that measure the same variables. The difficulty arises in formulating two tests that are similar in nature and measurement level. The researcher may also find it difficult to administer it to two similar populations. In social sciences, using parallel forms of the same test is difficult and subjectivity is highly involved.

4. Try out

In this stage a researcher has to collect the data for his study with the help of prepared research tool or tools.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. What is personality inventory?

………………………………………………………………………………
…………………….………………………………………….……………

2. List out the characteristics of a good case study.

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……………………………………….……………………………………

8.7 LET US SUM UP

In this unit you have learnt clinical interview, structural interview, and its advantages and limitations; questionnaire and its types; psychological test such as Thematic Apperception Test (TAT) and Rorschach test; case study and ethnography. You have also learnt construction and standardization of research tools.

8.8 UNIT-END EXERCISES

1. List out the pre-requisites for a successful interview.
2. Explain the interviewing techniques.
3. What is a questionnaire?

4. Describe the types of questionnaire.
5. What are the steps of the case study?
6. What is validity?
7. What is reliability?
8. Write an essay on Ethnogarphy.

8.9 ANSWER TO CHECK YOUR PROGRESS

1. Personality Inventory

Personality Inventory is a tool in printed form. It contains statements, questions or adjectives, which apply to human behaviour. The inventories are administered- to the subjects. They need to indicate their reactions to the various items of the inventory. Their reactions are then, scored and evaluated in terms of percentiles or other statistical norms.

2. Characteristics of a Good Case Study

1. It should be based on adequate and complete data.
2. Its data should be valid.
3. It should have continuity about it.
4. Its records should be kept confidential.
5. Its data should be scientifically synthesized and this synthesis should be as much prognostic as diagnostic.
6. Its follow up work should be undertaken.

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UNIT-IX RESEARCH DESIGNS

Structure

9.1 INTRODUCTION

A research design is a plan of the proposed research work. A research design represents a compromise dictated by mainly practical considerations. It is a catalogue of the various phases and facts relating to the formation of a research efforts. Suchman has pointed out that "a research design is not a highly specific plan to be followed without deviation, but rather a series of guide posts to keep one headed in the right direction."

A research design should be based on, more or less, methodology. It is prepared once the topic and problem for research has been selected and formulated, objectives have been duly outlined, concepts have been properly outlined and defined and the hypotheses have been properly framed. Of course, the research design is the conceptual structure within which research is conducted. In nutshell, it is a blue print for the collection, measurement and analysis of data. This unit deals with correlational design, experimental design and its types and application of Experimental Technique in child studies.

9.2 OBJECTIVES

After going through this unit, you will be able to:

- Define the term research design
- Understand the correlational design and experimental design
- Explain the types of experimental designs
- Discuss the application of experimental technique in child studies

9.3 GENERAL RESEARCH DESIGNS

A research design is the detailed plan of an investigation. It is the blueprint of the detailed procedure of testing the hypotheses and analyses of the obtained data. It is the framework or a roadmap that researchers utilize for planning, implementation and analysis of a research study. It is a systematic plan of what is to be done, how it will be done, how the data will be collected and analyzed, how the instruments will be used and the intended means for analyzing the data and its presentation.

A research design basically comprises the research approaches, dependent and independent variables, sampling design, a plan for data collection, analysis and presentation.

In simple terms, a research design is made up of the researcher's decisions pertaining to what, where, when, how much and by what means to carry out a research study. It clearly shows the sequence of conditions for the collection and analysis of data in a manner which aspires to combine relevance to the research purpose. It is an overview of what the researcher will do from writing the hypothesis and its operational significance to the final analysis of data.

According to Selltiz, Jahoda and Cook, "A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure."

According to Paul E.Green and Tull, "a research design is the specification of methods and procedures for acquiring the information needed. It is the overall operational pattern or framework, of the project that stipulates what information is to be collected from which sources by what procedures. If it is a good design, it will ensure that the information obtained is relevant to the research questions and that it was collected by objective and economical procedures."

The design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data. It should answer the following questions:

- ✓ What is the study about?
- ✓ What is the purpose and scope of the study?
- ✓ Where will the study be carried out?
- ✓ What type of data is required?
- ✓ Where can the required data be collected?
- ✓ What periods of time will the study include?
- ✓ What type of sampling will be used?
- ✓ What techniques of data collection will be used?
- ✓ How will the data be analysed?
- ✓ What will be the approximate expenditure?
- ✓ In what style will the report be prepared?

General Research Designs

It has now become conventional to speak of three general approaches to the study of human behaviour. This rubric serves to limit the boundaries of the present discussion.

The normative-descriptive study of children's group in their naturalistic setting is employed as a first approximation to the identification of the most significant variables in group functioning. Since this approach is usually applied far and wide over diverse cultural and social conditions and since it generally enjoys the "fresh-native-look" of phenomenology, it always bears the potential of uncovering heretofore hidden or neglected variables important of group functioning.

The correlational approach may or may not, utilize existing children's groups a research subjects. Its distinguishing characteristic is the attempt to identify co-variances among the variables related to group structure and dynamics or co-variances between these variables and certain manipulable dispositional conditions such as type of adult leadership. A "dominative" overtures made by different classroom teachers and the dominative responses of their pupils. The correlational approach is time-honored in Psychology, Geology, Astronomy and under any conditions pre-dispositional to the variance of some dimension of interest.

A substantial number of psychologists like to bring nature into the experimental laboratory. They prefer to follow the pattern of Physics and Chemistry rather than that of Astronomy or Geology. They attempt to control all but a very few of the "independent" variables, then systematically to vary these conditions in an effort to determine the covariation of selected "dependent variables". Although the control group is not a necessary component of the experimental method, it is a common adjunct, since it provides a reasonable estimate of the influence of the variables not under the experimenter's control. Despite its obvious operational complexities, the experimental method can be used to pinpoint co-variances with the greatest rigour. The contributions of experimental studies to our knowledge of psycho-physics, learning and psycho-physiology have been most impressive. Can the social psychology of group behaviour be expected to draw with equal success on experimental procedures of this type? It is too early to say, but it can be stated that controlled experimentation with children's groups has been conducted with signal success.

9.3.1 Correlational Design

The correlation method of research does not denote merely a statistical device of calculating coefficients of correlation between certain data. On the other hand, it is research approach, which analyses the relationship between data between variables and some results in such a way that the underlying pattern of relationships becomes clear. No doubt, this method utilizes the correlation technique of analysis. But it goes far beyond it and includes many other elements of a basic nature.

The correlation method has been put to various uses, chief among which are:

1. To measure the strength of association or the degree to which variation in one factor or a set of factors, is associated with variation in others. Variation between one factor and another may be positively, or negatively correlated from +1, through zero, to –1.
2. To predict scholastic success by utilizing available data or special data from the use of aptitude or prognostic tests. The prediction, of course, is not individual but average prediction.
3. To predict teaching-success and select teachers according to a composite criteria of teaching success secured through the technique of multiple correlation which takes account of many variables at once.
4. To predict school population which is a necessary aspect of educational planning.
5. To help in fundamental research through: (a) the construction of data-gathering tools (e.g. tests) and the determination of their reliability and validity; (b) factorial analysis, i.e. an analysis of the composition of some psychological phenomenon like intelligence.

The correlation method involves all the steps that are involved in other kinds of research. It requires for its material quantitative data in the form of scores in respect of different variables under consideration. These scores are analyzed through various statistical devices of finding out measures of relationship between different sets of data. The interpretation, however, of the calculated coefficients of correlation presents some difficulties. A researcher has to keep in mind many things while interpreting his coefficients of correlation. The important things among those are the following:

i. Coefficients of correlation do not represent percentage of anything. They are pure mathematical symbols and should never be mistaken for anything else.
ii. They are not to be interpreted in a linear sense, i.e 0.80 should never be taken to be twice as big as 0.40.
iii. Errors of measurement are important factors and should always be taken account of.
iv. Size of *r* depends largely on the range of measurements used in the calculation.
v. Allowance must be made for sampling variation in the magnitude of *r*, through calculating the Probable Error.
vi. A big *r* between factors may, in social science, denote only concurrence – not causation necessarily. Partial Correlation and Analysis of Variance might be useful devices in such cases.

Correlation techniques are used to ascertain the extent to which two variables are related; that is, the extent to which variations in one factor correspond with variations in another. Suppose that you want to know whether there was any connection – and how much – between the achievement and nutrition status of V standard children. On the basis of general impressions, one may have arrive at the hypothesis that the higher the nutritional status, the higher the achievements. To test this hypothesis and to determine the magnitude of the relationship, one can conduct a simple investigation.

A researcher can record the achievement marks of the V standard children who are selected for the study, find out the level of nutrition. If those children who are high on achievement are also high on nutrition, this will indicate a positive relationship.

Variables may be closely related, moderately related or completely unrelated. In general, the magnitude of a correlation depends upon the extent to which an increase or decrease in one variable is accompanied by an increase or decrease in the other – whether in the same direction or in the opposite direction. Correlations, therefore, range over a scale which extends from a perfect negative correlation, to no correlation, to a perfect positive correlation.

The correlation technique is valuable in cause-effect analysis, but it merely quantifies the extent to which two variables are related: it does not imply that a cause-effect relationship necessarily exists. Interpreting, the meaning of the relationship is accomplished by logical analysis rather than statistical computation. This interpretation is subject to all the pitfalls and limitations.

9.3.2 Experimental Design

If science is to achieve its goal-to explain, predict, and control behaviour and events – it is imperative that casual connections among particular phenomena be discovered. Thus, educators who design experiments that lay bare the causes producing certain events perform a service of utmost importance to society.

Conducting a test to determine cause is only one task involved in experimental research. Unless all the other procedures are executed with the greatest care, the experimental testing process is valueless. Perhaps the following list will give the reader a more comprehensive picture of the work one may have to do when undertaking an experimental study:

1. Identify and define the problem.
2. Formulate hypothesis and deduce their consequences.
3. Construct an experimental design that represents all the elements, conditions, and relations of the consequences. This may entail: (a) selecting a sample of subjects to represent a given population; (b) grouping or pairing subjects to secure homogeneity; (c) identifying a controlling non-experimental factors; (d) selecting or constructing and validating instruments to measure the outcomes of the experiment; (e) conducting pilot or “trial run” tests to perfect instruments or design; and (f) determining the place, time and duration of the experiment.
4. Conduct the experiment.
5. Reduce the raw data in a manner that will produce the best unbiased appraisal of the effect which is presumed to exist.
6. Apply an appropriate test of significance to determine the credence one can place on the result of the study.

If a hypothesis and its deduced consequences are well conceived, two factors are precisely identified:

(1) an independent variable and (2) a dependent variable

Condition A causes Condition B

1. Some investigators apply different names to these factors, such as (1) cause and (2) effect, (1) stimulus and (2) response, (1) antecedent and (2) consequent, (1) experimental variable and (2) behaviour variable, and (1) treatment and (2) effect.

A hypothesis suggests that an antecedent condition (independent variable) causes another condition, event, or effect (dependent variable) to occur.

To test a deduced consequence of a hypothesis, one constructs an experiment in which he attempts to control all conditions expect the independent variable which be manipulates. Then the investigator observes exposure to the independent variable, presumably because of the exposure to the independent variable. The independent variable is the phenomenon that appears, disappears, or changes as the researcher applies, removes or varies the independent variable. The independent variable is the factor that is manipulated to ascertain its relationship with the dependent variable under observation.

An investigator, for example, may hypothesize that children will learn to spell better if spaced drill is used rather than massed drill. The independent variable that will be manipulated in the experiments is the "spacing of drill". The dependent variable that will experience the effects of this manipulation is spelling mastery. To test this hypothesis, the experimenter must attempt to control all conditions so that they are the same for the two groups of children, except that he gives one group amassed spelling drill of sixty minutes once in a week and the other group a fifteen-minutes drill during the first four school days of each week. In other words, all conditions are held constant except the experimental variable – spacing of drill – which is manipulated. Consequently, any difference in the spelling mastery of these two groups at the close of the experiment can be attributed to the independent variable – spacing of drill.

Essential Requirement of an Experiment: Experimentation is not merely a little game of manipulating one variable to see what happens to another variable. Experimentation consists in controlled observation. The most important task that the researcher faces when planning an experiment is to achieve control over all factors that affect the dependent variable. Unless he identifies and controls them, he can never be certain whether it is the manipulation of the independent variable or some other factor that has caused the particular effect. Suppose, for example, that the teacher who conducted the spelling experiment did not control the selection of the spelling words, the amount of time devoted to study, and the selection of the subjects. It is surely possible that one group of students might have had easier words to spell, a longer total time to study, and greater spelling mastery prior to the experiment than the other group. When assuming the results of the experiment, the investigator would have had no way of knowing whether the spacing of drill or some other factors were responsible for the difference in spelling mastery.

The quality of the experiment is determined largely by the extent to which rigid controls are introduced. Some investigators test vaguely stated hypothesis without trying to identify and control the factors that influence the dependent variable, so their studies are not acceptable as scientific

experiments. Other researchers achieve a certain measure of control, but their results are always subject to question because of the limitations of their procedures. Achieving adequate control of the variables is extremely difficult because of the complex nature of educational phenomena, but the most competent experimenters strive to construct research designs that will give the greatest measure of control over them.

The experimental investigation has been gratifyingly fruitful in physical sciences. It promises to be equally useful in child psychology. The experimental procedure involves the systematic manipulation of carefully specified antecedent conditions and detailed observation of the consequences. In child psychology, where the control of extraneous variables is always difficult and uncertain, the experimental investigator typically utilizes a control group. Children in the experimental group are exposed to some environmental circumstance(s). Other children with the same adjudged characteristics and background, who make up the control group, are not given this exposure. At the end of the experiment, the two groups of children (control and experimental) are observed, or tested, to identify any differences in behaviour and/or development that may be inferred as a consequent of the experimental conditions.

9.3.2.1 Types of Experimental Designs

Before conducting a study, researchers must select an experimental design that is suitable for testing the deduced consequences of their hypothesis. The following discussion will briefly explain the nature of a few traditional designs and their limitations.

1. One-group Method: The simplest experimental method requires only one group of subjects. The researcher observes his subjects performances before and after he applies or withdraws an experimental variable, and measures the amount of change, if any, that takes place. Thus, his first task is to obtain some measure of the average or mean attainment of the group in the characteristic that is to be influenced. After administering Test 1 (T_1 may ascertain reading speed), he exposes the same subjects to an independent variable (such as a method of training) for a reasonable interval of time and then gives a second test (T_2). Next, he finds the average or mean score of the group on a second test (T_2) to determine what influence the independent variable (IV) had on the dependent variable (reading speed). To ascertain the amount of change (difference) that has taken place as a result of the exposure to the experimental variable, he subtracts T_1 from T_2.

The following paradigm and example may help you gain a better understanding of the one-group method:

Step 1 T_1......... IV…… T_2

Step 2 $T_2 - T_1$ =D (Difference between the mean scores)

In some one-group studies, two or more independent variables are successively administered to the same subjects. One may, for example, try to determine the effect of administering two different drugs or various dosages of the same drug on the time required to do a task. To accomplish this, one first exposes his subjects to one drug (T_1.......IV_1…..T_2) and then to

a second one (----……IV_2…..T_3). By comparing the results of the final tests (T_2 and T_3) one can make some judgement about which drug or dosage (IV_1 or IV_2) enabled the subjects to do the task in the least time. However, this design cannot be used unless the influence of the first independent variable is administered. Otherwise, T_3 would be measuring not only the influence of IV_2 but also the carry-over effect of IV_1. Moreover, this design usually requires that equivalent forms of the tests be used, so as to eliminate the practice effect of repeating the same test. If one must construct equivalent test forms, he may find it a difficult and time consuming process.

The one-group design has certain advantages and limitations. Since it involves only one group of subjects, it is simple to use. Because the same rather than dissimilar group of subjects is exposed to each independent variable, no part of the difference in the results can be attributed to the variability of the subjects. Since the method fails to control many non-experimental variables, it is difficult to ascertain whether the difference between the pre-test and post-test scores results from the influence of the independent variable or from other variables. Unless the one-group design is handled with care, the experimenter may easily give undue credit to the independent variable for causing changes and overlook other conditions that actually account for the results obtained.

It has been suggested that the probability of satisfying the fundamental criteria for selecting the one-group method is increased:

1) Where the EF of EF's (experimental factor or independent variable) produce a relatively drastic effect, for this tends to make the influence of irrelevant (non-experimental) factors practically negligible.
2) Where the experiment is of brief duration, for this abbreviates the action of large, constant, cumulative, irrelevant factors, such as maturing, for example.
3) Where the trait in question does not involve purposes or methods of work for these usually show a larger carry-over than specific information.
4) Where the tests are scaled on the basis of the same unit, for this increases probability of equality of units.

2. Equivalent-group Method. The equivalent-group experiment is designed to overcome certain difficulties encountered in the one-group design. To control some of the non-experimental influences on the dependent variable that the one-group design ignores, such as maturity, this method simultaneously utilizes two equivalent groups of subjects. The second group, which is called the control group, serves as a reference from which comparisons are made.

When employing the equivalent-group design, and investigator first selects two groups that are as much alike as possible. Then, he introduces an independent variable to the experimental group and withholds it from the control group. Thus, the control group carries on the customary manner, or receives no treatment, while the other group receives the experimental treatment. After a reasonable interval of time, the difference between the two groups is observed. Since the two groups are supposed to be equivalent in all respects, except for the exposure to the independent

variable, the researcher assumes that any difference that exists is a result of the experimental treatment. The difference is a measure of the effect of the independent variable. The aim of this design is to treat two like groups differently so as to draw a conclusion concerning the effects of the dissimilar treatments. Without a control group, the findings of many experiments are meaningless, for the possibility always exists that the same effect may have occurred without the presence of the experimental variable.

The experimenter utilizes a control group to strengthen his conviction that the independent variable actually is responsible for the change in the dependent variable. Suppose that in independent variable – a method of reading – is administered to one group of students and at the end of a specified time, they receive much higher scores on a reading test than they did on an equivalent form of the test taken prior to the experiment. One cannot be certain whether the higher scores were caused by the independent variable (the reading method) or by the maturation of the students. But, if two equal groups are used in the experiment and only one is exposed to the reading method, both groups would have matured the same amount during the conduct of the study. Consequently, one shall know that the difference in the test scores is not caused by maturity but presumably by the reading method. Thus, the control group makes the influence of the independent variable interpretable.

The following paradigm and explanation may help the reader gain a better understanding of the equivalent-group design:

Step 1. After equating the groups, the investigator gives all subjects an initial test (T_1) to determine their current status and finds the average or mean test score of the experimental group (T_{1E}) and the control group (T_{1C}). When this is completed, conditions are kept the same for the two groups except that the experimental group – but not the control group – is exposed to the independent variable (IV) for a stipulated period of time. Then both groups take a second test and the average score for each group (T_{2E} and T_{2C}) is found.

Experimental group T_{1E}……. IV…….. T_{2E}

Control group T_{1C}……………... T_{2C}

Step 2. The difference between the mean scores the each group made on the first and second tests is found.

Experimental group $T_{2E} – T_{1E} = D_E$ (Difference between mean scores on first and second tests)

Control group $T_{2C} – T_{1C} = Dc$ (Difference between mean scores on first and second tests)

Step 3. By comparing Dc and D_E – the mean change in scores obtained by two groups – the investigator can determine whether the application of the independent variable caused a significant change in the experimental group’s scores as compared to the control group’s scores. Appropriate statistical procedures are applied to ascertain whether the difference in the scores is sufficiently great to be real difference, or whether it is only a chance occurrence.

The equivalent-group design may also be extended to permit the study of two or more independent variables or several variations of the

same variable on a dependent variable. To ascertain the effect of teaching long division by two different methods, for example, three equated groups can be selected and one method can be applied to the first group, another method to the second group, and no long division instruction to the third group and the following paradigm indicates:

First Experimental group T_{1E1}………IV_1……..T_{2E1}
Second Experimental group T_{1E2}………IV_2……..T_{2E2}
Control group T_{1C}…………………..T_{2C}

If the researcher is merely interested in comparing the effects of the two treatments, he may not use the control group, but it does give him an added measure of information for interpretive purposes.

One cannot give casual consideration to equating the experimental and control groups, for this is a matter of crucial concern. The two groups must be as alike as possible in respect to all factors that influence the dependent variable. If this is not done, one cannot ascertain whether the difference between the results obtained for the experimental and control groups is attributable to the independent variable or to initial differences between the groups. Because human being vary in a multiplicity of ways, obtaining two groups of people that are alike in all respects is impossible. But the experimenter should at least attempt to fashion groups that are equivalent in regard to the relevant variables – those factors that others have found influence the dependent variable study. To accomplish the difficult task of equating groups, a researcher may employ the co-twin, matched-pairs, matched-groups, randomized-groups, or statistical technique.

(a) Co-Twin Technique: As nature does an excellent job of pairing identical twins, the so-called co-twin control is one of the most accurate pairing procedures known. It offers an unusual opportunity to study such problems, as just like the role played by learning and maturation. To ascertain whether maturation or training was significant aspect of bladder control, for example, McGraw selected two sets of twin boys. She exposed one boy from each set to toilet training for several months before she exposed their brothers. In a study concerning learning and growth, Gesell and Thompson gave an experimental twin training in stair climbing six weeks before the control twin quickly achieved the proficiency of the ones who had experienced the much greater number of practice periods. Hence, the findings suggested that the development of specified achievements was not hastened by prolonged training but was fundamentally a product of maturation – "ripeness of the neural structures."

(b) Matched-pairs Technique: Since a sufficient number of twins is rarely available for most experimental studies, investigators often employ the matched-pairs technique. In this method, an analysis is made to determine what factors influence the dependent variable. If it is reading ability, IQ, sex and socio-economic background exert an influence, one tries to find two subjects who are alike in these respects. After selecting a sufficient number of pairs, one assigns a member of each pair – usually at random – to the experimental group and the other member to the control group. Thus, the two groups are as nearly alike as the matching procedure permits.

Matched-pairs often proves to be an extremely difficult process. Usually one measures the relevant factors for a large number of subjects before finding a sufficient number of qualified pairs. Consequently, much time and effort is employed testing subjects who cannot be used in the study. Precise matching of more than two or three variables is rarely possible. Moreover, deciding which of the relevant variables should be given consideration in pairing often presents a thorny problem. If the remaining relevant factors – those not used as a basis for matching – are not randomized in the two groups they may bias the conclusions. Sometimes the tools used to measure the relevant factors are crude, consequently, it is questionable whether matching based on the results that they produce is ever present and the loss of any cases may impair the matching design.

(c) Matched-groups Technique: When it is not possible to find matching subjects, groups may be matched. To do this, one selects control and experimental groups that have the same average possession of each relevant variable – the same mean scores – and a similar distribution pattern of subjects' scores around the average. If, for example, intelligence is considered to have an effect on the dependent variable, the investigator divides his subjects into two groups and proceeds to find the average IQ of the members in each group. If one group has an average IQ of 100 and the other of 100, he shifts subjects from one group to the other until both groups have an average IQ of 105. But he cannot safely assume that the two groups are then equal, for the IQs in one group may range widely about the average and those in the other group may have a narrow range of variation. Thus, in addition to finding the average IQ, he uses statistical procedures to ascertain the nature of distribution of the scores. If the patterns differ in the two groups, he also tries to make them similar.

The matched-group technique is not free from disadvantages. Suppose that one is matching two groups in terms of intelligence and some skill. Even though the distribution of the IQs and skill scores is equated for the two groups, it is possible for subjects in the groups to have different combinations of these capacities as the following illustration reveals:

Group X: Low IQs with high skills and high IQs with low skills.

Group Y: High IQs with high skills and low IQs with low skills.

If these differences exist, they can affect the conclusions of the study.

(d) Randomized-group Technique: Determining what factors to equate, precisely measuring the known relevant factors, and finding matched subjects cannot always be done. To achieve equivalency of the experimental and control groups in such instances, one may employ randomization techniques. Randomizations is not a haphazard or arbitrary method of selecting subjects; it is a systematic procedure. The researcher refrains from exercising direct control over the assignment of subjects because he may consciously or unconsciously choose the better ones for the experimental group. To avoid the introduction of a bias towards the greater achievement of either group, some mechanical randomization technique is employed that gives each individual in a population an equal chance of being placed in any given group. Quite commonly the people in the population are numbered consecutively and a published Tables of

Random Sample Numbers or some other chance procedure is used to assign each individual until half are placed in one group and the other half in the other group.

(e) Statistical Techniques: Sometimes it is impossible or impractical to control variables by direct selection of subjects. A superintendent of schools, for example, may be unwilling to re-organizing classes on a matched basis for experimental purposes, but he may permit an investigator to study two classes as they are constituted. If groups cannot be equalized prior to experimentation, statistical control procedures are employed. This is necessary in instances where a factor that influences the dependent variable is not observable until after an experiment is under way. In a study of the effect to different diets of children, for example, all subjects may be given the same amount of food, but not every subject will necessarily eat everything he is given. If some of them do not, this may influence the results. But this factor can be observed and measured during the experiment and accounted for by statistical procedures when analyzing the results.

The most commonly used statistical control is known as the analysis of covariance. When employing this technique, the investigator observes the uncontrolled variable in the two groups during the experiment and makes appropriate adjustments for the source of variation in the analysis of the outcomes. This statistical procedure, permits an investigator to carry out an experiment with the same precision as if he had matched the experimental and control groups.

3. Rotation-group Method: The rotation-group method of experimental research overcomes some of the difficulties encountered in the one-group and equivalent-group methods. It is commonly employed in situation where a limited number of subjects are available or where a comparison of teaching methods is made. The first stage of a rotation-group method is the same as the equivalent-group method. Group A experiences the experimental treatment (IV_1) while group B is exposed to the traditional or other treatment (IV_2). In the second stage, the groups rotate their roles.

State 1	Stage 2
Group A: IV_1	Group A: IV_2
Group B: IV_2	Group B: IV_1

Thus, when employing the rotation-group method the researcher applies the same independent variables to different groups at different times during the conduct of the experiment. To compare the effectiveness of the text-book and field-trip methods of instruction, for example, he may have subjects study units concerning two city departments: fire and police. After designing appropriate tests for each unit and selecting two groups of students that are as equivalent as possible, he exposes the two groups to the same method of instruction but at different times during investigation. The following discussion gives a detailed explanation of what is done:

Stage 1. The two groups take pretests to ascertain what they know about the fire department and the average or mean score for each group (T_1) is found. Then Group A receives textbook instruction (IV_1) on this unit while Group B takes field trips (IV_2) to the fire department.

Afterwards both groups take a second test and the average score for each group (T_2) is found.

Group A: T_1……. …IV_1…… T_2
fire…… text….. fire

Group B: T_1……. …IV_2…… T_2
fire…… field….. fire

Then the difference between the mean scores that each group made on their first and second tests is found.

Group A: $T_2 - T_1 = D_1$
text

Group B: $T_2 - T_1 = D_2$
field

Stage 2. In the second stage of the experiment, both groups take pretests on what they know about the police department and the average score for each group is found. But this time Group A rather than Group B goes on the field trip (IV_2) and Group B receives the text-book instruction (IV_1). Afterward both groups take a second test and the mean score is found for each group.

Group A: T_2 …………...IV_2……..…T_2
police…….field……police

Group B: T_1 …………...IV_1……..…T_2
police……..text……police

Then the difference between the mean scores that each group made on their first and second tests is calculated.

Group A: $T_2 - T_1 = D_3$
field

Group B: $T_2 - T_1 = D_4$
text

Stage 3. The mean change in scores obtained by the two groups from the field trip instruction is added - $D_2 + D_3$- and the mean change obtained from textbook instruction – D_1+D_4 – and the results are subjected to a statistical analysis that permits one to appraise the effectiveness of the methods.

The rotation method rotates out some non-experimental factors that influence the dependent variable. If the children in one group are more able than those in the other group, both independent variables – the field and text-book methods – will profit equally from their superiority. If the subject matter and test used in the police unit are more difficult than those used in the fire unit, the difficulty is rotated out for both the field and textbook methods come under these influences. When students are exposed to the second unit of work, they will be more mature and they may carry over some of the learning acquired on the first unit, which will influence their test results. But since both independent variables are exposed to these influences once during the conduct of the experiment, the effect of maturation and carry-over learning on the dependent variable tends to be minimized. However, the results obtained would be a measure of average effects which need not be the same as direct effects.

The rotation technique cannot equalize effectively all non experimental factors. If the carry-over learning from IV_1 to IV_2 and IV_2 to

IV_1 for example, is not of the same magnitude in both instances, the carry-over factor may be minimized, but it will not be equalized. Nor can the rotation technique cope adequately with factors such as bias on the part of the teacher or the tests in favour of one experimental variable. Neither is equalization achieved if subjects in one group become more fatigued or less highly motivated with the progress of the experiment than the other group.

4. Ideal Experimental Design: The one-group, equivalent-group, and rotation-group designs all have limitations. Each is useful in different situations, but no one design can be used to solve all problems. The nature of the problem determines which design is most appropriate and how it should be tailored to meet the needs of a particular study. Researchers have devised several variations of the traditional methods discussed in this designs.

Selecting the proper design for an experiment is a challenging task because a multiplicity of factors must be taken into consideration. An ideal design must achieve a number of objectives.

The experimental procedures must be designed to elicit and control the expression of the variables through which the conditions of the theorem are represented. They are known as the experimental variables.

The experimental procedures must be designed to control the expression of all other variables that re-operative in the empirical situation.

The experimental procedures must be designed to register all behaviour that may either directly or indirectly pertain to the testing of the theorem. This requires that procedures be used that make a faithful and permanent record of any changes reflected in behaviour that result from variables operating during the empirical test.

The experimental procedures must be designed to separate the behaviour changes pertinent to the theorem from all other behaviour changes. It is necessary that behaviour changes that can be used as evidence be in a form that can be analysed independently of other behaviour changes.

The experimental procedures must be designed to enable the investigator to evaluate the amount of evidence and the degree of pertinence of the evidence in relation to the theorem being tested. This is best accomplished by quantitative descriptive of the variables and quantitative analysis of the relationship existing among the variables.

The proceeding objectives represent an ideal experimental situation. Fully attaining these objectives in social sciences is not always possible, but these are the goals towards which researchers strive.

9.4 APPLICATION OF EXPERIMENTAL TECHNIQUE IN CHILD STUDIES

The formula for experimentation in child behaviour is simply translated from the general formula. A situation is constructed that allows for the control of all factors affecting a child's behaviour; subsequently, one of these factors is introduced as a variable, and objective observations are made of any consequent changes in the child's behaviour. The detailed

application of this formula involves a recognition of the behaviours that a child exhibits and of the factors that can influence those behaviours. The traditional conceptual scheme for enumerating the sources of all such factors lists three major areas; the limitations of an experimental technique in the study of child behaviour become apparent when the experimenter's ability to control factors from these areas is evaluated. The three areas are:

1. The child's present environment
2. The child's past environment and
3. The child's genetic endowment.

1. The Child's Present Environment

Clearly, the child's present environment will prove the simplest to control. Simply by choosing a well-placed room as a laboratory, the experimenter prevents a large amount of uncontrolled stimulation to the child. Within a room it is practical to wield stimuli in a systematic manner and to observe and record behaviour accurately and reliably. The thoroughness with which current environment can be controlled is readily demonstrated on the animal level, where a selected response of an individual animal in a properly engineered experimental situation can easily be shown to vary only in response to the experimenter's manipulation of the stimulus environment.

The history of science suggests that the complexities of the child's real world are probably only multiple combinations of pure and simple processes. Hence, the complicity of child behaviour reflects only the large number of factors involved; yet each factor by itself may operate in a simple manner, readily and completely understandable in a laboratory setting.

Since this supposition has served other sciences well in the past, no other justification need be offered. Its acceptance means that "artificial" laboratory studies of the child's response to his present environment becomes not only valuable but in fact essential. But by no means are such studies exhaustive. A science of child behaviour will require a great deal of additional information that laboratory techniques will prove inadequate to apply.

Ideally, the highly controlled, artificial laboratory stimulation is not the final goal of an experimental technique but rather a string point. When the experimenter can show that the behaviour under study varies only in response to his own manipulations of simple factors, then he is assured that he is in a good position, not to generalize about the child's real world, but to investigate more complex factors. These may be added to his highly controlled situation, one at a time, and the effects upon the behaviour noted. The culmination of this process may be very complex variable indeed, with the experiment in possession of data showing the workings of its components. "The laboratory experiment is a technique for basic and theoretical research and not a goal of an empirical science" (Festinger and Katz, 1953).

2. The Child's Past Environment

An investigator who presently observes a child's behaviour tends to believe that factors affecting his behaviour are located in the child's distant past. In this case the possibility of control of the variables is lost, the

factors gone forever. Although they cannot be controlled by the experimenter, it may be possible for him to assess and relate them to the child's present behaviour. But so doing will rarely qualify as an experimental technique. Any supposed causes of a child's behaviour, located in his past history, may themselves be considered effects of some prior cause. Hence, it is not clear where in this succession of causes the child's present behaviour should be referred. Indeed, there exists the possibility that the child's present behaviour is only a manifestation of a long-standing interaction, which is also responsible for the child's history.

For example, one may relate current "adjustment" to the feeding schedule adopted by the mother during infancy. It is possible that a properly chosen feeding schedule promotes subsequent adjustment; it is possible that the mother's basic attitudes may lead simultaneously to a particular feeding routine and "good" adjustment in the child but that feeding routine itself does not promote adjustment; and it is at least conceivable that manifestations of a child's subsequent adjustment may influence the mother in her choice of a feeding schedule rather than vice versa. This difficulty is avoided in an experimental approach, basically because it is the experimenter who is the cause of variations in particular factors, if he is careful to avoid bias in his own manipulation of these factors. Yet it cannot be denied that an experimenter will find it difficult to establish experimental control over a variable such as feeding schedule for an appreciable part of an infant's history.

If a historical variable is under study, it can only be because the experimenter suspects that it will have an effect upon a child's behaviour. If the effect is thought to be beneficial, many care-takers will consider it immoral to have their children left in a control group; if the effect is thought to be detrimental, no one, including the experimenter, will care to fill the experimental group with his charges.

The most frequent applications of an experimental approach, however, have been applied to the child's present environment.

3. The child's genetic endowment

The child's inheritance is the most difficult source of variables to bring under adequate experimental control. Current genetic theory ascribes to the genes the power to stimulate development along certain dimensions, including behavioural dimensions. The genes are not directly manipulable. The chromosomes upon which genes are said to be arrayed are not, for practical purposes, directly manipulable. They are manipulable indirectly by the use of selective breeding procedures, but this is a technique explicitly denied in the study of human development. The recent advances in cloning and gene manipulation are yet to bring beneficial effects on human beings.

The child psychologist, then, is left with the possibility of doing something with the children who occasionally come in sets of identical and fraternal twins. A certain experimental logic has grown out of this fact aimed at identifying the degree to which any behaviour is influenced by inherited factors. Identical twins have identical inheritance; hence differences between them may be attributed to environmental action. But similarities between identical twins are much more difficult to refer to

genetic endowment. Fraternal twins do not have an environment so similar as identical; half of all fraternal twin pairs have different-sexed members, whereas identical are always same-sexed. Further, fraternals frequently look different; identical rarely do. Evaluation of this argument again returns the experimenter to a thorough study of the relative similarity of environmental factors, not inherited ones. An assumption is made that identical reared apart must have less similar environments than fraternals reared together. Hence greater similarity between identical than between fraternals must reflect inherited factors. But, again, it can be pointed out that twins reared apart typically share an environment involving early separation from the mother, a variable considered of great significance but not thoroughly understood.

By way of summary, then, it appears that the virtue of any experimental technique is that it yields a relatively unambiguous conclusion about casual relationships. In an area as complex as child studies this virtue is of extreme value: when relationships are ambiguous, too many alternative conclusions of too variegated a nature are possible. However, experimental techniques are most readily applied to controlling the child's present environment; extensive control of the child's interaction with his past environment, although often possible, is more often difficult for both practical and ethical reasons. Since the child's past environment traditionally and logically is a central source of variables in child development, this difficulty constitutes a limitation on the use of experimental techniques in this area. Furthermore, an experimental approach will frequently aim at abstracting a fraction of the child's total environment for study in a controlled setting. Consequently, many of the relationships produced appear devoid of immediate "practical" or "real life" application.

Current use of experimental techniques, then, seems aims at three eventualities:

1. The quantification of precise, reliable, and unambiguous laws of child behaviour in relation to the present and short-term past environments.
2. The gathering together of such laws into a general system of behaviour theory, so that generalized statements about these laws have organizing and unifying value and perhaps, practical application.
3. The extension of such a body of fact and theory, through the use of other research techniques, to include more variables from the child's long-term past environment and so produce a more comprehensive theory of behaviour and its development.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Define - Research Design.

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2. State the uses of correlation method.

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9.5 LET US SUM UP

In this unit you have learnt correlational design, experimental design and its types such as one-group method, equivalent-group method, rotation-group method and ideal experimental design. You have also learnt application of experimental technique in child studies.

9.6 UNIT-END EXERCISES

1. What are the types of experimental design?

2. What is co-twin technique?

3. Discuss the application of experimental technique in child studies.

9.7 ANSWER TO CHECK YOUR PROGRESS

1. Research Design

According to Selltiz, Jahoda and Cook, "A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure."

2. Uses of the correlation method

1. To measure the strength of association or the degree to which variation in one factor or a set of factors, is associated with variation in others. Variation between one factor and another may be positively, or negatively correlated from +1, through zero, to –1.
2. To predict scholastic success by utilizing available data or special data from the use of aptitude or prognostic tests. The prediction, of course, is not individual but average prediction.
3. To predict teaching-success and select teachers according to a composite criteria of teaching success secured through the technique of multiple correlation which takes account of many variables at once.
4. To predict school population which is a necessary aspect of educational planning.
5. To help in fundamental research through: (a) the construction of data-gathering tools (e.g. tests) and the determination of their reliability and validity; (b) factorial analysis, i.e. an analysis of the composition of some psychological phenomenon like intelligence.

9.8 SUGGESTED READINGS

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UNIT-X DESIGNS FOR DEVELOPMENT IN CHILD STUDIES

Structure

10.1 INTRODUCTION

The designs for development in child studies are concerned with behavioural variables which differentiate a child at different stages of age, growth or maturation. Developmental studies investigate the growth and development of the child in the areas of physical, intellectual, emotional and social development. The purpose of developmental research is to assess changes over an extended period of time. For example, developmental research would be an ideal choice to assess the differences in academic and social development in low-income versus high-income neighbourhoods. It is most common when working with children as subjects for obvious reasons and can be undertaken using several methods: longitudinal, cross sectional. This unit deals with longitudinal design and cross-sectional design.

10.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of developmental studies
- Know the meaning of longitudinal studies
- Know the meaning of cross-sectional studies
- Understand the types of developmental studies
- Apply suitable method of developmental studies

10.3 DESIGNS FOR DEVELOPMENT IN CHILD STUDIES

According to L.R.Gay “developmental studies are concerned primarily with behaviour variables that differentiate children at different levels of age, growth and maturation.”

In developmental studies both longitudinal and cross-sectional methods are followed according to the requirement. When the same group of children are studied over a period of time as the children progress from one stage to another, at that time longitudinal studies are used. When different children at various stages of development are studied at that time a researcher uses cross-sectional studies.

10.3.1 The Longitudinal Design

A longitudinal study is a research design that involves repeated observations of the same variables (e.g., people) over long periods of time, often many decades (i.e., uses longitudinal data). It is often an observational study, although they can also be structured as longitudinal randomised experiments.

A longitudinal research design is a type of non-experimental developmental research design that can be used in order to study age-related changes in behaviour. Within the design, the same participants are observed recurrently over a period of time. This period of time may be as brief as six months to a year or quite long-sometimes even spanning a lifetime. The researcher may study one specific aspect of development (for example, intelligence) or many. The subjects are usually studied in the form of cohort. It means they roughly belong to the same age and have grown up in similar circumstances.

In the longitudinal method the same sample of subjects is studied over an extended period of time. Researchers studying the development of quantitative concepts of elementary school, pupils, for example, would start by measuring the quantitative skills of a group of first-graders and would continue by making annual measurements of their skills, at each successive grade level. Thus the researchers could assess how these skills develop over a period of time for this group. Since, they are dealing with same individuals, such factors as initial ability will remain constant and the difference observed between two grade levels can be interpreted as changes in quantitative skills related to the growth of the subjects.

Using the longitudinal method, Honzik, Macfarlane, and Allen studied the fluctuations of IQ scores, of children from age2 to 18. They found that the IQ scores of over half the group changed 30 or more points, and scores separated by a short period correlated more highly that scores, separated by long period. When they studied individuals who showed consistent upward or downward trends, it was found that such changes tended to be in the direction of the family’s socio-economic status; that is, those children whose IQ scores showed consistent downward trends came predominantly from lower socio-economic groups and those whose scores exhibited consistent upward trend were large from higher socio-economic groups.

The longitudinal method allows for intensive studies of individuals because the investigator accumulates data for the same subjects at various levels. However, longitudinal studies have inherent practical difficulties.

To begin with they demand an extended commitment from an individual or institution willing to spend time; money, and other resources for several years before completing the project. If the sample selected should prove to be a poor one, there is nothing that can be done to remedy it, nor can new longitudinal variables for investigation be introduced after the study has matured. Keeping up with subjects who move, may become extremely difficult. In some cases, also, it proves difficult to maintain the cooperation of subjects for the extended period.

Longitudinal research enables researchers to analyse the duration of social phenomena, highlight similarities, differences and changes over time in respect of one or more variables or participants (within and between participants); identify long-term effects; and explain changes in terms of stable characteristics, e.g. sex, or variable characteristics, such as income (Ruspini 2002).

Longitudinal studies can be retrospective (looking back in time, thus using existing data such as medical records or claims database) or prospective (requiring the collection of new data).

One example of a longitudinal developmental study is that of Howes and Matheson (1992), in which the pretend play of a group of 1 to 2 years old children were repeatedly observed every 6 months over a period of 3 years. Howes and Matheson found that complexity of pretend play increases with age and is also a reliable predictor of children's future social competence with peers.

Types of Longitudinal Research

There are three major types of longitudinal studies:

- Panel Study: involves sampling a cross-section of individuals. A panel study involves a sample from different groups that still fit the subjects of the study.
- Cohort Study: a group of people who share a defining characteristic, typically who experienced a common event in a selected period, such as birth, geographic location, historical experience or graduation and perform cross-section observations at intervals through time.
- Retrospective Study: involves looking at the past by looking at historical information such as medical records.

Longitudinal studies of the cohort analysis type have an important place in educational investigations. They have considerable potential for yielding rich data that can trace changes over time and with great accuracy (Gorard 2001). On the other hand, there is serious problem of attrition (participants leaving there search over time, a particular problem in panel studies which research the same individuals over time). The studies can be both costly and time-consuming (Ruspini 2002).

Cohort, trend and panel studies are prospective longitudinal methods, in that they are ongoing in their collection of information about

individuals or their monitoring of specific events (Ruspini 2002). The cohort method studies separate samples from a single group over time. In a cohort study, a researcher selects a group on the basis of a specific event such as birth, geographic location or historical experience. Trend studies analyze samples from succeeding groups over time whereas in a panel study a single sample (same individuals) from a group is studied over time.

Advantages of Longitudinal Research Design

The following are the advantages of longitudinal research design:

- The design allows researchers to assess the stability and continuity of several attributes of a sample by repeatedly observing the same participants (Kagan and Moss 1962).
- The design allows researchers to identify developmental trends by looking for common attributes that the subjects share, for example, points at which most children undergo changes (Newman et al. 1997).
- Longitudinal design avoids effects of different cohorts because only one group of people is examined by the researcher over time, than comparing several different groups that represent different ages and generations.
- Researchers can describe how a single individual's behaviour changes with age.
- The design combines both qualitative and quantitative data, creating more in-depth research (Ruspini 2002).
- The researcher can look at changes over time. Thus, longitudinal methods are particularly useful when studying development and lifespan issues.
- Since the genetics of participants share are similar, it is assumed that any differences are due to environmental factors.
- They help researchers to establish a sequence of events when looking at the ageing process.

10.3.2 Cross Sectional Design

Many of the practical difficulties of the longitudinal method are not characteristic of the cross-sectional method. This approach studies subjects of various age levels at the same point in time. For example, a cross-sectional study of the development of quantitative skills would employ a different sample and of the standard levels. It would compare the statistics derived from the samples and draw conclusions about the growth of children with these skills.

A cross-sectional attempts to examine people of different ages at the same time(s). A researcher develops cohorts from the study population, so that he can examine how people of different ages perform, behave or respond to a particular function.

A cross-sectional study is one that produces a "snapshot" of a population at a particular point in time. The study involves looking at

people who differ on one key characteristic at one specific point in time (Ruspini 2002).

The design is used to capture information based on data gathered for a specific point in time. In this design, the investigator gathers data from a pool of participants with varied characteristics and demographics known as variables such as age, gender, income, education, geographical locations and ethnicity. However, the choice of variable or demographics depends on the type of research being conducted and on what the study aims to prove or validate. The research findings assist him to remove assumptions and replace them with actual data on the specific variables studied during the time period under consideration in the cross-sectional study.

A cross-sectional study is primarily an observational study. This means that researchers record information about their subjects without manipulating the study environment. The researchers do not try to modify the behaviour of participants.

Cross-sectional studies are basically descriptive. A purely descriptive cross-sectional study is used to assess the frequency and distribution of a particular trait in a defined population.

Salient Features of a Cross-sectional Research Design

The salient feature of a cross-sectional study is that it can compare different population groups at a single point in time. It is just like taking a snapshot. Findings are drawn from whatever fits into the frame. However, you should recognise that cross-sectional studies may not provide definite information about cause-and-effect relationships. The simple reason is that such studies offer a snapshot of a single moment in time; they do not consider what happens before or after the snapshot is taken. Therefore, you cannot know for sure if, for example, your students taking private coaching had low test score levels in economics before taking up their private coaching, or if taking private coaching helped them to obtain higher test score levels that previously were low.

Cross-sectional research studies are based on observations that take place in different groups at one time. This means that there is a complete absence of any kind of experimental procedure. In other words, the researcher cannot use any variable for manipulation. Instead of performing an experiment, he or she would simply record the information that he or she observes in the groups he or she is examining. Consequently, he or she uses a cross-sectional research study for describing the characteristics that exist in a group, but it cannot be used to determine any relationship that may exist. This method is used to gather information only. The information may then be used to develop other methods to investigate the relationship that is observed.

Advantages of Cross-sectional Research Design

An important benefit of a cross-sectional study design is that it allows researchers to compare many different variables at the same point in time. We could, for example, look at age, gender, income and educational level in relation to study the relationship between having school textbooks and test score levels, with little or no additional cost.

Other advantages are:

- ❖ Relatively inexpensive and takes up little time to conduct.
- ❖ Can estimate prevalence of outcome of interest because sample is usually taken from the whole population.
- ❖ Focus on studying and drawing inferences from existing differences between people, subjects or phenomenon. They help the generation of hypotheses.
- ❖ Groups identified for the study are purposely selected based upon existing differences in the sample rather than seeking random sampling.
- ❖ Contains multiple variables at the time of the data snapshot.
- ❖ Many findings and outcomes can be analysed to create new theories/studies or in-depth research.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. Give the meaning of Longitudinal and Cross-sectional studies.

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2. What are the advantages of Cross-sectional design?

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10.4 LET US SUM UP

In this unit you have learnt designs for development in child studies like the longitudinal design and the cross-sectional design. In longitudinal design meaning, types of longitudinal research and advantages of longitudinal research design and in cross-sectional design meaning, features of cross-sectional design and advantages of cross-sectional design have also been discussed in detail.

10.5 UNIT- END- EXERCISES

1. What are the types of longitudinal research?

2. What are the features of cross-sectional research?

10.6 ANSWER TO CHECK YOUR PROGRESS

1. Longitudinal Study

A longitudinal study (aka longitudinal survey, or panel study) is a research design that involves repeated observations of the same variables (e.g., people) over long periods of time, often many decades (i.e., uses longitudinal data). It is often an observational study, although they can also be structured as longitudinal randomised experiments.

Cross-sectional Study

A cross-sectional study is one that produces a "snapshot" of a population at a particular point in time. The study involves looking at people who differ on one key characteristic at one specific point in time (Ruspini 2002).

2. Advantages of Cross-sectional Research Design

An important benefit of a cross-sectional study design is that it allows researchers to compare many different variables at the same point in time. We could, for example, look at age, gender, income and educational level in relation to study the relationship between having school textbooks and test score levels, with little or no additional cost.

Other advantages are:

- ❖ Relatively inexpensive and takes up little time to conduct.
- ❖ Can estimate prevalence of outcome of interest because sample is usually taken from the whole population.
- ❖ Focus on studying and drawing inferences from existing differences between people, subjects or phenomenon. They help the generation of hypotheses.
- ❖ Groups identified for the study are purposely selected based upon existing differences in the sample rather than seeking random sampling.
- ❖ Contains multiple variables at the time of the data snapshot.
- ❖ Many findings and outcomes can be analysed to create new theories/studies or in-depth research.

10.7 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
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UNIT-XI PROBLEMS IN DEVELOPMENTAL RESEARCH

Structure

11.1 INTRODUCTION

The purpose of developmental research is to assess the changes over an extended period of time. It is most common when working with children as subjects for obvious reasons and can be undertaken using several methods. Human development can be studied by two methods: the longitudinal and the cross-sectional techniques. In both type of studies a series of planned and systematic observations are made. In the longitudinal studies, the growth states of the same children are measured at different ages. One might, for example, test and measure the same group of students on a number of variables when they are twelve, thirteen, fourteen, and fifteen years of age and plot their individual growth patterns for these factors during these years. But when conducting a cross sectional study, rather than repeatedly measuring the same children, you make one set of measurements of different children from each age level. Then you calculate the averages for the variables for each group and plot these averages to depict the general growth patterns of each variable for children from twelve through fifteen years of age.

This unit deals with changes in procedure during longitudinal studies, problems in conducting longitudinal research and cross-sectional research and further deals with analysis of longitudinal data.

11.2 OBJECTIVES

After going through this unit, you will be able to:

- Understand the changes in procedure during longitudinal studies
- Describe the problems in conducting longitudinal and cross-sectional research
- Know the analysis of longitudinal data

11.3 CHANGES IN PROCEDURE DURING LONGITUDINAL STUDIES

Longitudinal research serves not only as a data-collection device but also as a source of hypotheses for the researcher. Although independent verification will normally be necessary to confirm such hypotheses, one of the ancillary advantages of "big" longitudinal research is the opening up of new areas for fruitful study. To make optimal use of this characteristic, the investigator will often have to leave some ambiguity in the first definition of his procedures.

There is another compelling reason for the occurrence of procedural shifts in repeated-measurements study - the absence of a single observational technique that is applicable across the developmental span. One may want to record general activity or reflex responsiveness in the newborn, but such observations will not provide adequate measures of variability in the 2-year-old; character of social interaction with peers may bė an important dimension of adolescent behaviour, but it is less likely to be discriminating in the study of the toddler, and so on. Particularly in the observation of the child from birth to school-age, it is necessary to change techniques used to gather data as the child grows older. This consideration poses a serious problem for the understanding of development – how are we to translate from one observational technique to another? To put the question in another way, what constitutes the "same" behaviour at different ages? A 6-month-old is judged to be active on the basis of observations quite different from those used to assign a 5-year-old a "high activity" score. Similarly, the evaluation of quality of mother-child interaction will depend on markedly different criteria when the child is 1 year old and when he is *7.* An irreducible problem of developmental research is that we must modify our data-gathering techniques as the child and his environment change. Moreover, it is no solution merely to give the same name to the results of different observational procedures, an "anxious" 2-year-old is not similar to an "anxious" third-grader because we use the same word to describe their behaviour.

The difficulty underlying shifts in observational procedure is not likely to be easily removed; solution will demand both sharpening of our conceptualizations of development and a great deal of research comparing different observational modes. Perhaps the potentially most profitable approach to this issue is the over-lapping of different techniques; at an age at which two or more procedures may be appropriate, they can be used simultaneously or in close succession to evaluate the relationships among them (Bell, 1953). For the area of development testing, there are data of this sort available, and the careful investigation of relationships among tests (Maurer, 1946; Hofstaetter, 1954) has provided leads for a better understanding of what goes on when we modify our devices for collecting data about developmental status or intelligence. Related investigation is in order for establishing correspondence among different ways of assessing social responsiveness, quality of mother-child interaction, emotional development, and many other aspects of children's development. Short of

empirical evidence about rules for translating the results of varying observational techniques, the developmental researcher would seem well advised to respect the operationalist's injunction against assuming the equivalence of different procedures. The tangle that results from being forced to change modes of observation in order to keep up with changes in the child will be teased apart only with the help of further empirical examination of research methods.

The relationship between a longitudinal researcher and his subjects is not simply an exchange between a source of data and a data-recording system; it is a social interaction that can become, in long-term studies, fairly intimate and complicated. It was suggested earlier that subjects stay in longitudinal studies at least in part for the support the researcher provides as a competent and attentive professional. If this is the case, he will not remain totally inconsequential in his effect on the participating parent.

As the investigator gets to know the child and his parents, and as they get to know him, there arises the possibility that they will change their “normal” behaviour or their reports to conform to his position, however mildly expressed. If this kind of distortion occurs at a high rate, then the validity of long-term longitudinal studies of the development is in jeopardy.

Some precautions can be taken, nonetheless; rather than pretending to be above or beyond evaluative opinion about his subjects, it would appear wiser for the psychologist to be as explicit as he can to himself and his colleagues in the research about his prejudices and antipathies. In this way, he will be alerted to signs that his subjects are "coming into line" and can take further precautions against applying improper pressure on them. Beyond this, the longitudinal researcher can take whatever comfort is available in parents' rearing practices are unlikely to occur in response to the researcher's weak expression of his attitudes.

The longitudinal researcher must recognize that he is not seeing his subjects in a perfectly natural state and that they will occasionally be influenced in their behaviour as a result of often-repeated inter-actions with him. But as long as he is tuned to the possibility of distortion and discrete in the social exchange that is part of research on human behaviour, it is unlikely that he will seriously reduce the validity of his findings by making his subjects too responsive to his own pre-conceptions.

11.4 PROBLEMS IN CONDUCTING LONGITUDINAL AND CROSS-SECTIONAL RESEARCH

Problems in Conducting Longitudinal Research

The following are the problems in conducting longitudinal research:

1. They require huge amounts of time

Time is definitely a huge disadvantage to any longitudinal study, as it typically takes a substantial amount of time to collect all the data that is

required. Also, it takes equally long periods to gather results before the patterns can even start to be made.

2. They risk gathering data that is not 100% reliable

While data is collected at multiple points in this method of conducting research, you cannot pre-determine and take into account the observation periods regardless of what happens between these points. Aside from this, respondents would unknowingly change their qualitative responses over time to better suit what they see as the objective of the observer. Generally, the process involved in longitudinal studies will change how respondents and subjects the questions that are being used.

3. They would risk experiencing panel attrition

One of the biggest disadvantages of conducting longitudinal studies is panel attrition. This means that, if researchers are only relying upon the same group of subjects for a research that takes place at certain points in time in years, then there is the possibility that some of the subjects would no longer be able to participate because of various reasons, such as changes in contact details, refusal, incapacity and even death, which cuts down the usable data to be drawn to formulate the conclusion.

4. They require a large sample size

Another problem that makes longitudinal studies not the perfect option to conduct research is that they typically require large sample sizes. So, you must have a large number of cooperating subjects for your research or else it will not realize or be valid.

Other problems of longitudinal research are:

- The design demands high commitment in order to continue and complete the duration of the study. Participants tend to drop out over time.
- So is the case with the researcher. He or she must remain interested in the research whilst he or she waits for years to see the final results.
- The research design is also very expensive to conduct, since the researchers must track people down and persuade them to come back and participate in the study.
- The design requires periodic training of the research team over many years.
- By the end of the research project (after 10 or 20 years), the project outcome may seem trivial.

Problems in Conducting Cross-sectional Research

The following are the problems in conducting cross-sectional research:

- Finding people, subjects or phenomena to study that are very similar except in one specific variable can be difficult.

- Results are static and time bound and, therefore, give no indication of a sequence of events or reveal historical or temporal contexts.
- Studies cannot be utilized to establish cause-effect relationships.
- This design only provides a snapshot of analysis so there is always the possibility that a study could have different results if another time frame had been chosen.
- There is no follow-up to the findings.
- The timing of the snapshot is not guaranteed to be representative.
- Findings can be flawed or skewed if there is a conflict of interest with the funding source.
- It cannot be used to analyze behavior over a period to time
- The researcher may face some challenges putting together the sampling pool based on the variables of the population being studied.
- Unable to chart individual variations in development or changes, and their significance.
- Sampling not entirely comparable at each round of data collection as different samples are used.
- It can be time-consuming as background details of each sample have to be collected each time.
- Omission of a single variable can undermine the results significantly.
- Unable to chart changing social processes over time.

11.5 ANALYSIS OF LONGITUDINAL DATA

After the longitudinal researcher has fought his way through the web of problems that surround the setting up and execution of an extended study of child development, he faces one last task - the analysis of his data. On occasion, there is nothing in this process special to longitudinal study; when the research is of limited scope and when there are established conventions for handling data analysis, the investigator goes about his work with no more hesitation than is usual for students of human behaviour.

One corrective to this difficulty is that the goals of the project must be carefully thought through in the planning stage and careful estimates made of the time and effort that will be required to keep abreast not only of the child and his environment but of one's data as well. This sort of calculation may result in a restriction of the range of behaviour observed, in a limitation on duration of the study, in a reduction in the size of anticipated sample, or in an increase in professional personnel scheduled for the project, but it will also make more likely the presentation of a terminal report.

Child psychologists are not seers, however, and the intricacy of children's development demands a good deal of flexibility in the planning of research. Assuming that, in spite of appropriate and considered planning, the researcher finds his data coming in faster than he can analyze

them, what can be do? One possibility, which has additional advantages to be mentioned is to set up a two-team organization for the research. One group of workers collects data and maintains contact with the subjects; the other sets itself the task of coding, summarizing, and analyzing observations.

Finally, the problem of "too much" can be put in better perspective if the double function of longitudinal research is remembered. Extended observation of children with an eye to including a wide range of behaviour serves the important purpose of outlining a series of problems for later concentrated study. It may be most fruitful for child-development research in the long run for psychologists to recognize frankly the preliminary characters of current long-term longitudinal research on the development of the child and to accept the data obtained as an unrivaled source of hypotheses rather than as a finished set of observations that must be analyzed in detail. This orientation would reduce our distress at being unable to have in public-view all the results of the "second-stage" collection of stable generalizable relationships in child development.

The longitudinal researcher who cannot, because of the exploratory nature of his study, state in advance how he will analyze and present his data runs the risk of another stumbling block - contamination. If, for example, a researcher has observed the development of a child from birth to 4 years and at the end of this period sets about his analysis and summary, he cannot examine his information about the child as infant free of influence from his knowledge of the child's later behaviour. If he knows the 4-year-old to be dependent, anxious, or active, the investigator's appraisal of the child's infancy will be directed in part by this knowledge nor are adequate checks always available when a group of children is under study because the long-term longitudinal sample will often not be large enough to preclude selective treatment of the data.

The two-team approach to longitudinal study, which permits the analysis of data as they are collected, stands as one technique for reducing contamination of this sort. When the behaviour of the 4-year-old is observed, whatever can be said about his infancy has been said some time earlier, and the investigator's response to later behaviour cannot influence the report of the child's infancy.

Short of concurrent analysis, the problem of contamination can be dealt with by replication. When a relationship is found in an overview of developmental data collected in longitudinal study, it is usually appropriate to check its generality by an observation of new cases. The creative use of longitudinal observation is an important part of child-development research, and it permits the presentation of an integrated sensible picture of the developing child. However, this exploratory function must be supported by more limited and precise study under circumstances in which contamination does not introduce the possibility of error.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. State any five problems of longitudinal research.

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2. List out any four problems of cross-sectional research.

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11.6 LET US SUM UP

In this unit you have learnt changes in procedure during longitudinal studies, problems in conducting longitudinal research and cross-sectional research and further analysis of longitudinal data.

11.7 UNIT-END EXERCISES

1. Discuss the changes in procedure during longitudinal studies.

11.8 ANSWER TO CHECK YOUR PROGRESS

1. Problems of Longitudinal Research

The following are the problems in conducting longitudinal research:

- ❖ The design demands high commitment in order to continue and complete the duration of the study. Participants tend to drop out over time.
- ❖ So is the case with the researcher. He or she must remain interested in the research whilst he or she waits for years to see the final results.
- ❖ The research design is also very expensive to conduct, since the researchers must track people down and persuade them to come back and participate in the study.
- ❖ The design requires periodic training of the research team over many years.
- ❖ By the end of the research project (after 10 or 20 years), the project outcome may seem trivial.

2. Problems in Cross-sectional Research

The following are the problems in conducting cross-sectional research:

- ❖ Studies cannot be utilized to establish cause-effect relationships.
- ❖ This design only provides a snapshot of analysis so there is always the possibility that a study could have different results if another time frame had been chosen.

- ❖ It cannot be used to analyze behavior over a period to time.
- ❖ The researcher may face some challenges putting together the sampling pool based on the variables of the population being studied.

11.9 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
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UNIT-XII ETHICS IN RESEARCH ON CHILDREN

Structure

12.1 INTRODUCTION

Research stands for the systematic study of different social objects and phenomena which include human beings as they are the integral part of the society. There are so many vulnerable groups who have been being used as subjects of different kinds of research and the ethics of the research is required to uphold their rights, especially for the children. The basic principles of ethics ensure the principles of justice, mutual respect and the avoidance of doing harm to children subject to any research. As human beings, children are the beneficiaries of rights as articulated under a number of international human rights instruments for example, the International Covenant on Civil and Political Rights (ICCPR) 1966 and United Nations Convention on the Rights of the Child (UNCRC) 1989.

This unit deals with the ethics in research on children, guidelines for ethical research practice and need and importance of ethics in research on children.

12.2 OBJECTIVES

After going through this unit, you will be able to:

- Know ethics in research on children
- Explain the guidelines for ethical research practice
- Understand the need and importance of ethics in research on children

12.3 ETHICS IN RESEARCH ON CHILDREN

Children are both precious and vulnerable. Unlike animals, they cannot be sacrificed for research. They must be treated with all the safeguards that our civilization demands for the study of human beings.

At the same time, they are vulnerable. There is a widespread assumption that children are less resistant and resilient than adults; that is, that stress, frustration, emotional experience, and pressures that would cause only temporary discomfort in adults may produce long-range consequences in children. Actually, the evidence for this belief is almost non-existent, but neither is there clear contradictory evidence. Since nobody wants to take any chances, behavioural research among children in stricted by narrower limits than comparable research among adults.

Not only are children perhaps more vulnerable, but they are also nor free agents, able to make their own discussions and to take their consequences. They are below the age of consent, so to speak, and the investigator who undertakes research must obtain consent from the people responsible for the child and must act in loco parentis while the child is in his care.

It is necessary on some occasions that the adult subject be unaware of the purpose or the procedure of an experiment. This circumstances is sometimes used as an excuse to put adult subjects into experiments that they would never enter voluntarily, even when the knowledge would not affect their behaviour in the experiment as much as it would lead them to refuse to participate. The general practice of deceiving the subjects of psychological experiments in roundly condemned by a large section of the psychological profession. They argue that in most cases the experiment can be done equally well without deception, that if necessary the subject can be told frankly that it is necessary for him to be ignorant of the purpose of the experiment and that the few experiments in which deception is absolutely required are better left undone. These psychologists point to the growing public image of the psychologist as under-handed. The widespread use of deception in experiments and in disguised forms of testing, such as projective methods, does justify his mistrust. Such procedures are used to make the subjects reveal information without the subject's knowledge or consent. These suspicions of the intent of psychologies can have serious consequences, indeed. One of the ironic features of the situation is that in most cases deception is unnecessary; consent could be readily obtained by a frank discussion of the psychologist's interests.

When we study children instead of adults, the issue is put more squarely. Clearly there is no reason to device the child's parent or teacher about the purpose of the experiment, except the fear that person would be unwilling to allow the child to participate or that he would be coaching or instruction try to ensure that the child's behaviour would not reflect unfavourably on him or his parents. The ways in which the parent or teacher might interfere with the experiment may seem unfortunate to the psychologist, but in a real sense, they are the prerogatives of the person in whose care the child is placed. If he is not convinced that the psychologist will do the child no harm or fears the implications the experimenter might draw from the child's behaviour, the psychologist has either done a poor job of explaining what he is going to do or has persuaded the parent against his will to let the child participate. Although the experimenter may be convinced that the parent's anxieties are groundless and that his fears are defensive, it is still the prerogative of the parent to have them and to

behave accordingly. The psychologist who takes it upon himself to decide when another free agent's fears are groundless without having been delegated that power is treading upon dangerous ground. All the arguments against deceiving adult subjects hold even more strongly when we consider the problem of deceiving not the child subject but his care-taker.

The experimenter is well advised, therefore, to explain quite frankly to the person responsible for the child, what he is interested in studying and how he intends to proceed and to answer openly any questions about the effects of the experiment on the child. If he feels sure that he cannot explain everything to the parent, then he should say that he cannot do so, but ask the parent to trust him. In the vast majority of cases, he can obtain consent; the experimenter's fear of being refused permission are almost as groundless as the groundless anxieties be attributes to the subject. There will be refusals, but researchers have to accept them. Their frequency will increased only if they adopt the short-sighted strategy of obtaining consent by deception.

Once the care-taker's consent has been obtained, then the experimenter faces a similar set of problems as far as the child is concerned. There may be real necessity to conceal some of the purposes of the experiment from the child, and in the case of younger children it may be quite impossible to make the child understand the purpose of the experimenter. The quite sensible general practice is to treat the child more and more like an adult subjects the older he is. With pre-school children, the request to "play some games with the experimenter" or the explanation that "we want to see how children like you play with these games" is probably about as good as can be done.

After the experiment is over, particularly if some deception of the child is necessary, the research worker can well take time to give an explanation that is geared to the level of the child. School-age children can understand the purposes of research and the need for experimental and control groups. Such an explanation has many good effects. It makes the child feel that he is a participant in scientific research - science is a highly esteemed actively to which most people are delighted to contribute. It makes the children feel that the experimenter is an honest person whose intentions in his experiment were not malevolent. It allays some anxiety and provides an opportunity for the experimenter and the care-taker to recognize individual children who should be given some special explanation and reassurance. Finally, it is an excellent concrete teaching device for the discussion of the scientific method and allows the experimenter to communicate some of the basic scientific values that we feel are important.

12.4 GUIDELINES FOR ETHICAL RESEARCH PRACTICE

Paul H. Mussen provides a detailed discussion on Research Ethics. Children are not much more in the "public" domain of researchers of many training backgrounds and interests than was the case in the first half of the century, when research on children came almost exclusively from

Departments of Child Welfare and Education. Also, children are now involved in a much greater volume of research. The need and obligation of investigators to acquire some understanding of children before using them as research subjects assume, therefore, rather considerable importance. The child cannot be used naively as a substitute for the college sophomore or for the rat, for reasons methodological as well as ethical.

Usually a close relation exists between research wisdom and research ethics in studying human behaviour. This is nowhere more evident than in work with children. The essence of research ethics is consideration for the research participant. Maintaining confidentiality of data and exercising precautions to prevent harmful effects of data gathering and reporting are the essential elements. Beyond this core of agreement, opinions and ethical practices vary.

By definition, attitudes and values are affect-laden, and to them may be attached rewards and punishments of "conscience" and society. They are part of the "private" world of the individual, to reveal or conceal as he sees fit; therefore, by probing into them in research, one is immediately confronted with something of an ethical dilemma. However, on many issues, subjects of our research-wise culture are not hesitant about laying bare their attitudes.

The subject's permission is usually recognized as his to give or withhold before research is done. With children, this permission-giving power is usually vested in the parent or parent-surrogate, leaving to the child a much smaller margin of power, that of being cooperative or not, once he is in the research. One can readily feel a legitimacy in this procedure while at the same time also feeling that the child's participation. The obligation remains of granting some degree of self-determination on the part of the child. His developmental level and the problem under investigation may be guides in weighing research hazards to the subject and deciding research policy in this regard.

The child's willingness to participate and his understanding of what he is asked to participate in should be looked at together in considering ethics and procedures. Concealment of research purpose – by stating a different research objective from the real one, by partly disguising the objective, by giving no explanation, by completely concealing the fact that research is going on – has become very nearly conventional in experimental approaches, testing, interviewing, and observations. The primary defense for this practice is, of course, that without camouflage many problems could not be subjected to systematic scrutiny. In many instances they accept the fact that they do not know the specific purpose, but they are willing to "go along" or to wait until after it is over to be told its significance. With younger children, we have been quite uniform in disguising research as "play".

Child below some age or intellectual level there is no concept of "research". Here one should consider most carefully the child's reactions to research. One should ask oneself whether the content of the research task is congruent with a "play" explanation. When interview questions or projective play-devices tap attitudes regarding ego-involving, possibly

painful experiences, the child expecting to play with the investigator may feel “sold” or tricked.

A responsibility for knowing the impact of the research experience on the child should be part of any investigator’s task. Although we know that this is not fully possible, it is possible to build into one’s procedures some provisions for evaluating the impact. Planned alertness to the spontaneous comments, gestures, and postures of the child can furnish information.

Despite the limitations of the “play” approach, it must also be said that “it works” in many situations. Its congruence with task is perhaps the best guide to the reasonableness of its use. There are other alternatives that can better be used when content is not play-like. An investigators explanation to children that he is writing a book on what children think about such and such or that he is studying how children solve problems are examples of plausible purpose in line with the research objectives, yet do not necessarily interfere with the process under study. The feasibility and value of taking child subject into full confidence should not be completely overlooked. This was done in a study in which pre-adolescent children were seen in small friendship groups by group workers in a neighbourhood house. The children were invited to come together to talk about inter-group problems, as they experienced them in their school and neighbourhood, to help the worker who was interested in studying these problems and writing about them in a book on children.

Hand in hand with the meanings that the researcher tries explicitly to give to the child are the subjective meanings to the child. We know that the investigator of attitudes and values may bring the child uncomfortably close to distressing areas of his life (conflicts with authority figures, guilts, painful problems of self-awareness). The investigator often faces the hard reality that to some degree and for some children has research may contribute to a child’s problems. This may come about as a result of having brought latent feelings to the surface through research by direct questions or by indirect techniques. The possibility exists, too, that the child’s verbalization and playing out of feelings in research may have a therapeutic effect. Also, research may create conflicts where none existed before. For example, when investigating values regarding honesty, the researcher may devise situations in which the child is motivated to receive certain rewards or to avoid failures. In order to do so, dishonest behaviour may be involved. The investigator may be a hard time deciding how seriously the child will regard his own transgressions. Are the experimental techniques justified?

The child’s welfare sometimes enters research in another form. The investigator may suddenly find himself with a personal responsibility, which comes from privileged knowledge of the child or adolescent. Through the child’s revelations in research, clinically and socially serious attitudes are revealed. To divulge them to the present teacher, or therapist, from whom help can come, is to violate the confidentiality promised. Not to reveal them may leave remediable conditions unremedied. When data are gathered in childhood and adolescence for follow-up study in later years of childhood or adulthood, the carry-over of the child’s expressed

attitudes into the future may have consequences for the individual in cases in which the attitude has particular social or personal relevance.

These methodological-ethical issues pose difficult questions. To what extent should be the researcher restrict himself to the use of methods that keep to a minimum-disturbing responses in children, in spite of the fact that other methods might be more effective and productive? To what extent is the investigator morally responsible for helping a child to restore equilibrium after eliciting from him emotional reactions associated with some of his attitudes and values? The specific instrument used, the context in which the research is done, the investigators characteristics, and the child's characteristics together determine the impact of a given procedure and help to determine answers to these questions. No research is justifiably undertaken on children's attitudes and values without consideration of its effects. In part, the answer to what is ethical in research lies in what the investigator is equipped to understand about children and what he is equipped to do by way of "treatment" in the event that some is necessary.

Having stressed the problematic aspects of attitude research with children, one should not be frightened away from it. The moral is not to blunder into children's feelings and conflicts and private worlds. Knowledge of children, although it appears self-evident, is critically important in designing and conducting research. Research errors of misinterpretation and misjudgment of the child often arise because of a lack of this knowledge, thereby rendering research less efficient and mildly or seriously trampling on the rights of the child. Errors tend to be of two sorts either making the same assumptions for the child as for the adult or far under-estimating the child's sensitivities and capabilities. Areas of error involve the relationship of investigator to the child, the thought processes and verbal facilities of the children, and the research-induced motivations used for children.

12.5 NEED AND IMPORTANCE OF ETHICS IN RESEARCH ON CHILDREN

Each Country has a set of ethical rules as well as several international organizations and researchers have played a critically important role in developing ethical guidance for research involving children. The researchers must consider the potential negative impacts of research for the children's lives, sense of identity and belongingness and the course of data collection, information gathering, interpretation and analysis of the collected data. In fact, the principle of beneficence refers to the actions that promote the well-being of children. Rosie Flewitt (2005) argued that researchers have a responsibility towards the participants of all ages not only to establish a robust and negotiated ethical framework for their research, but also to ensure that these ethical principles are applied throughout the stages of the research process.

In practice, most of the research, children may be at the ethical questions that arise are about the best interests, the risks, the justification of a research for subjects along with the rights of the children and the authority of parents to give permission, the assent and consent which are related to children in research. Similarly, the way in which these ethical

issues are tackled in practice can be quite different from each other. Often the way of conducting such researches could ignore, although most times unintentionally, the children's rights. Consequently, the children are presented as the silent victims of a tragedy, or are included in clinical research without their consent; whereas their human rights and their right to be protected are being jeopardized.

Historical Background

The historical origin of the ethical principles for research with children arose from the Nuremberg Trials, which took place after the Second World War and the Nuremberg Code of 1947, which emerged first of these. The Nuremberg Code 1947 applied particularly to experimental research, although it had wider relevance to the key ethical principles in terms of voluntary consent, freedom to consent and avoidance of unnecessary pain or harm. The Code sets out statements of certain moral, ethical and legal principles relating to the research involving human subjects. Initially, these ethical guidelines were primarily concerned with medical research. However, they were subsequently used as a basis for guidelines for social research.

Thereafter, the emergence of the Declaration of Helsinki in 1964 which amended in 1989 and 1996 now includes an examination of the issue of children as research subjects in relation to informed consent in clinical research. The principles for conducting research contained in the Declaration of Helsinki apply to all human subjects, adults and children. The declaration indicated that adequate information must be provided to the research participants as well as participation in the research must be freely volunteered with the understanding that the participant can withdraw at any time. In addition, informed consent should be obtained, preferably in writing by the principles. There is one section, which refers specifically to research with children and states: "when the subject is a minor, permission from the responsible relative replaces that of the participant in accordance with national legislation. Whenever the minor child is in fact able to give consent, the minor's consent must be obtained in addition to the consent of the minor's legal guardian. However, there are different guidelines about the ethics of research with children, related to different disciplinary perspectives.

Ethical Challenges during Research

The general purpose of research that involves children is to obtain and produce scientific information about them. In this backdrop, the researchers should focus on the issues arising during research and take all reasonable precautions to ensure children will not be harmed or adversely affected by participating in the research. Similarly, researchers have to ensure that the children participating do so at their own volition and that the rights of the child are fully respected in the research process. The researcher is also obligated at all times to use the least stressful research procedure whenever possible. But the benefits of conducting such research must be balanced with ethical concerns. The research in children has based its ethical guidance around some of the following principles:

1. Informed consent

In every case informed consent must be obtained from the child's legal representative and the child's assent should be obtained through the provision of age-appropriate information. The application of general principles indicates that, where children have "sufficient understanding and intelligence to understand what is proposed", it is they and not their parents whose consent is required by law.

The Nuremberg Code 1949 appears to introduce the concept of consent for the participation of children in research. According to the Declaration of Helsinki, even though a child may not be legally competent to give consent, researchers should gain informed consent. This means that parental consent is not enough and that both the parents and child should be informed about the implications of the research. Parental and/or guardian's (informed) consent is required for a child (a person below the age of 18) to participate in research. It is essential that the child has the full information about the research in order to give their 'informed consent' to take part, and that consent is 'freely volunteered'.

2. Assent and children's indications of rejection

Information presented to the child and parent, should explain: what will happen; what is being asked of the child; that the child can agree – or disagree to take part – without adverse consequences; and may withdraw at any time; and be given in clear language at a level that the child can understand, using visual aids if necessary. If children are not fully informed of the research topic, informed consent is automatically denied even if the children are able to decide about participation, since informed consent exists only when one is fully informed.

3. Child protection and well-being

Research involving children is important for the benefit of all children and should be supported, encouraged and conducted in an ethical manner. In the course of research, information comes to the researchers' attention that may jeopardize the child's well-being. The researcher has a responsibility to discuss the information with the parents or guardians and with those experts in the field in order that they may arrange the necessary assistance for the child. Thus, if at any time during the research process there is an indication that a child's safety or well-being is being negatively affected; the research must be kept suspended until the issue has been addressed. If the child appears to be negatively affected by the research, the parent or guardian must be informed and the child and family must be offered with appropriate support. Besides, extra time and support should be given for the children. Similarly, dissemination of findings will need to be informed by an understanding of the specific communication needs of the children and their families.

4. Minimizing the risk of harm

Ethical guidance and practices aim to minimize possible exploitation and ensure that the rights and welfare of children in research. Accordingly, a key ethical consideration in research involving children is the level of risk to which children may be exposed. Risk refers to the potential harm (physical, psychological or social) that may arise from the research. The researcher should pose more identifiable risks of harm.

Similarly, researchers should not use those types of research procedure that may harm the child either physically or psychologically.

Ethics after Research

Ethics after the research in children of equal importance like the ethics upheld throughout. The researcher has to ensure the ethical processing of data, the way this data will be stored and made available to others. Personal data are usually protected by data protection laws, but there could be situations where a parent, who has provided consent, requires information about the research results, while the child participating in the research has been assured that her/ his answers will not be revealed. The topic of confidentiality is very problematic both for achieving the previously mentioned balance and protecting children participants from disclosure. One way of getting over this challenge is to ask for permission of the child subject to disclose information about the research afterwards although what the child understands can be very different.

Hence, confidentiality is very important since the disclosure of information can put the children and their rights at risk. Most of the researchers treat all information as confidential, but confidentiality cannot be guaranteed. So, in order to ensure the confidentiality of actual research, some researchers may think that compromising the results to parents and caregivers is not something that could harm the children subjects. The issue of privacy, for example, encompasses the trade-offs between confidentiality and child safety and the need to maintain confidentiality in the dissemination of research findings.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. How should a researcher follow the ethics after research on children?

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12.6 LET US SUM UP

In this unit you have learnt ethics in research on children, guidelines for ethical research practice and need and importance of ethics in research on children.

12.7 UNIT-END EXERCISES

1. Discuss the guidelines for ethical research practice.
2. Explain the need and importance of ethics in research on children.
3. Describe the historical background of ethics in research on children.

12.8 ANSWER TO CHECK YOUR PROGRESS

1. Ethics after Research on Children

Ethics after the research in children of equal importance like the ethics upheld throughout. The researcher has to ensure the ethical processing of data, the way this data will be stored and made available to others. Personal data are usually protected by data protection laws, but there could be situations where a parent, who has provided consent, requires information about the research results, while the child participating in the research has been assured that her/ his answers will not be revealed. The topic of confidentiality is very problematic both for achieving the previously mentioned balance and protecting children participants from disclosure. One way of getting over this challenge is to ask for permission of the child subject to disclose information about the research afterwards although what the child understands can be very different.

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UNIT-XIII ANALYSIS OF RESEARCH DATA

Structure

13.1 INTRODUCTION

A research study produces a mass of raw data. These data are obtained from administration of one or more standard tools or self-developed instruments or from naturally available sources. In order to arrive at a conclusion the researcher needs to interpret the data. So that the collected data can be analyzed in accordance with the stated hypothesis. Thus analysis of data means editing, coding, organizing, classifying and tabulation of the collected data.

The term analysis means computation of certain measurers along with searching for patterns of relationship that exist among data groups. So that in the process of analysis, relationships or differences supporting or conflicting with original or new hypotheses should be subjected to statistical tests of significance to determine with what validity data can be said to indicate any conclusions. Therefore before analysis the data must be organized. This unit deals with analysis of research data, qualitative data analysis, descriptive statistics, inferential statistics and interpretation of data.

13.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of data analysis
- Understand the benefits of data analysis
- Discuss the organization of collected data for analysis
- Understand the role of descriptive and inferential statistics
- Explain the principles of interpretation

13.3 ANALYSIS OF RESEARCH DATA

Data analysis is one of the main steps of the research process. How to analyze the data is an important question that every researcher asks. It is an important step in answering an experimental question. Analyzing data from a well-designed study helps the researcher answer questions. With these data, the researcher can also draw conclusions that further the research and contribute to future studies. Keeping your data well organized during the collection process will help you make the analysis step that much easier.

The process of analyzing information calls for examining it in ways that disclose the relationships, patterns, trends and so on that can be found within it. That may mean putting it to statistical operations that can tell us not only what kinds of relationships seem to exist among variables but also to what level we can trust the answers we are getting. It may mean comparing our information to that from other groups (a control or comparison group, statewide figures and so on) to help draw some conclusions from the data. The point, in terms of our analysis, is to get an accurate assessment in order to better understand our work and its effects on those we are concerned with or in order to better understand the overall situation.

Before analysis the data must properly be organized. The process of organization includes Editing, Classifying and Tabulating the data. They are given in detail.

(a) Editing the Data

It is a process of examining the collected raw data to find out errors and omissions, if any, and to correct it, if possible. So it is a process of careful scrutiny of the responded questionnaires or schedules etc. Editing is made to be sure that the data collected are accurate, consistent with other facts gathered, uniformly entered, as complete as possible. It also ensures that data have been well organized to facilitate coding and tabulation.

Editing can be done just at the time of data collection for example at the time of receiving a questionnaire from the respondent. This type of editing is called as Field Editing. It can also be done after receiving all the responses. Here one single editor edits all the responses. This type of editing is known as Central Editing.

(b) Coding the Data

Coding is the process by which we assign numerals or other symbols to answers so that responses can be put into a limited number of categories or classes. This classification should be made according to the research problem. While coding we must look to the exhaustiveness of data means there must be a class for every data item. The data should possess the mutual exclusively, means a specific answer can be placed in one and only one cell in a given category set. Another fact to be kept in mind is

unidimensionality, means every class should be defined in terms of only one concept. The coding process makes the analysis easy. We can reduce the sample into sample number classes which provide necessary information required for analysis.

(c) Classifying the Data

It is a general tendency of the researchers that they use large samples. As a result they obtain a large volume of raw data. Therefore to make these data meaningful it must be reduced to homogeneous small groups. For this we need to classify the data. It is the process of arranging data into groups or classes on the basis of some common characteristics. Thus the total data can be divided to a certain number of classes. According to the nature of the phenomenon under classification, we can categories the process into two types.

1. Classification according to attributes

2. Classification according to class intervals.

1. Classification according to Attribute

There are certain variables which are expressed numerically and others descriptively. The variables like weight, height, age etc. are expressed numerically and variables like honesty, sex, feelings etc. are expressed descriptively. Descriptive characteristics refer to qualitative phenomenon which cannot be measured quantitatively. What we can do, only indicate their presence or absence in an individual or the degree to which the attribute is present. In this process the data are obtained to certain attributes. So it is called as Statistics of Attributes.

In this type of classification we can make simple classification or manifold classification. In simple classification, we take only one attribute, and divide the population into two classes. One class who possesses the attribute and the other class who do not possess the attribute. In manifold classification two or more attributes are taken at a time and classified into number of classes. Another important fact in classification according to attribute is that, the attributes should be defined clearly in behavioral terms.

2. Classification according to Class-intervals

There are certain phenomena which are quantifiable. It means they can be expressed numerically. For example, the income, height, weight, age, etc. are expressed in numerical terms. These variables are classified on the basis of class intervals. For examples, we can group the individuals according to height from 3 feet to 4 feet, Group-1, 4 feet to 5 feet, Group-2, 5 feet to 6 feet Group -3. Like this we can divide all the individuals into different groups or classes.

(d) Tabulating the Data

Tabulation is the process of arranging data in a concise and logical order. It is a process of summarizing raw data and displaying the same in compact form, i.e. in the form of statistical tables. This process helps in the analysis of data.

Tabulation of data conserves space and reduces explanatory and descriptive statement. It facilitates the process of comparison. It facilitates the summarization of items and the detection of errors and omissions. It also provides a basis for various statistical computations.

A researcher can tabulate the data manually or mechanically by using electronic devices. Generally it depends upon the size and volume of the data to be tabulated. In case of large data the researcher may use calculating machines or computers. If the sample size is small and size of the data collected is small in number, the researcher may do hand tabulation. It can be done by using the direct tally, the list and tally or the card sort and count methods.

In direct tally method, the codes are written on a sheet of paper, called tally sheet and for each response a stroke is marked against the code in which it falls. Another method followed in Hand tabulation is card sorting method. In this method the data are recorded on special Cards of convenient size and shape with a series of holes. Each hole stands for a code and when cards are stacked, a needle passes through particular hole representing a particular code. Then the cards are separated and courted. Now a days the use of computer has become very common. So it is the safest and easiest way to use computer for data tabulation. It is because it also helps the researcher in data analysis. Now advance level computer programmes are available which automatically tabulates the data and analyze it as required.

Benefits of Data Analysis

The following are the benefits of data analysis:

- It allows meaningful insights from the data set.
- It highlights critical decisions from the findings.
- It allows a visual view leading to faster and better decisions.
- It offers better awareness regarding the habits of potential customers.
- It structures the findings from survey research or other means of data collection.
- It breaks a macro picture into a micro one.
- It rules out human bias through proper statistical treatment.

13.4 QUALITATIVE DATA ANALYSIS

Data analysis is a systematic search for meaning. It is a way to process qualitative data so that what has been learned can be communicated to others. Analysis means organizing and interrogating data

in ways that allow researchers to see patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques, or generate theories. It often involves synthesis, evaluation, interpretation, categorization, hypothesizing, comparison, and pattern finding (Hatch 2002).

In its simplest form, data analysis is, thus, a process of inspecting, cleaning, transforming and modeling data with the goal of discovering useful information, suggesting conclusions and supporting decision making. It is the process by which large amounts of raw data are reviewed in order to determine conclusions based on that data.

Data analysis refers to the process of organizing material in order to reach at the finding. The data are studied to find out hidden facts. It is better to plan for the analysis before data collection. Thus analysis is a process of computation of certain indices or measures along with searching for patterns of relationship that exist among the data groups. Analysis involves estimating the values of unknown parameters of the population and testing of hypothesis for drawing inferences.

13.5 DESCRIPTIVE AND INFERENTIAL STATISTICS

When you conduct a research study, you are quite often confused between descriptive and inferential statistics, making it hard for yourself to distinguish the best option to use in your research. If you look closely, the difference between descriptive and inferential statistics is already pretty obvious in their names. 'Descriptive' describes data, while 'inferential' infers or allows you to arrive at a conclusion based on the collected information.

Analysis may be categorized into two types such as Descriptive analysis and Inferential analysis.

(a) Descriptive analysis

It is a procedure of analyzing data through descriptive statistics. “Descriptive statistics permit the researcher to meaningfully describe many, many scores with a small number of indices”. If these indices are calculated for a sample drawn from a population the resulting values are referred to as Statistics. If they are calculated for an entire population they are called as Parameters.

Some of the major statistics used are Measures of central tendency, Measures of variability, Measures of relationship, Measures of relative position. Measures of central tendency is used to measure the averages or central value of the group. The Mean, Median and Mode are the measures of central tendency. The measures of variability indicating the spread of the scores in a group. The statistics used to measure the spread of the scores are the range, average deviation, quartile deviation and the standard deviation. The measures of relationship indicate the degree to which two sets of scores are related. Measures of co-efficient of correlation helps us to

measure the relationship. Measures of relative position describe a subject's performance compared to the performance of all other subjects. Another method of making idea about the distribution of scores is graphical representation of the scores.

(b) Inferential Analysis

Inferential analysis is made with the help of inferential statistics. Inferential statistics deal with inference of all things. It is a process by which inferences are made about the population on the basic of sample data. Most of the educational research deals with sample studies. Inferential statistics are concerned with determining how likely the results based on sample or samples are the same that would have been obtained for the total population. The values obtained from sample are called as Statistics, and the corresponding value in the population are known as Parameters. So if a mean is drawn from a sample it is called as statistics and if it is drawn from a population is called as parameter.

For example, if someone draws two samples randomly and after the study find that there is a difference between the means of two groups. But now the question arises whether there is a real such difference existing in the population or not. But as we know there is no such difference in the population and the difference found in the sample are only due to chance error. Thus inferences concerning population are only based on probability. There are various methods of inferential statistics, Standard errors, Test of significance, Analysis of variance, Analysis of covariance and Factorial analysis.

Descriptive Statistics Vs Inferential Statistics

The difference between descriptive and inferential statistics can be summarised as follows:

- ❖ Descriptive statistics merely 'describes' research and does not allow for conclusions or predictions.
- ❖ Inferential statistics makes it possible for the researcher to arrive at a conclusion and predict changes that may occur regarding the area of concern.
- ❖ Descriptive statistics usually operate within a specific area that contains 'all' the target population.
- ❖ Inferential statistics usually takes a sample of a population especially if the population is too big to conduct research.
- ❖ Descriptive statistics is focused on summarizing the data collected from a sample. The technique produces measures of central tendency and dispersion which represent how the values of the variables are concentrated and dispersed.
- ❖ Inferential statistics generalizes the statistics obtained from a sample to the general population to which the sample belongs. The measures of the population are termed as parameters.
- ❖ Descriptive statistics make only summarization of the properties of the sample from which data were acquired, but in inferential

statistics, the measure from the sample is used to infer properties of the population.

- ❖ In inferential statistics, the parameters were obtained from a sample, but not the whole population; therefore, always some uncertainty exists compared to the real values.
- ❖ Inferential statistics starts with a hypothesis (a statement of, or a conjecture about, the relationship between two or more variables that you intend to study) and investigates whether the data are consistent with that hypothesis.

Although descriptive and inferential statistics both are used for purpose of analysis of the data, still both of them are different in various ways.

13.6 INTERPRETATION OF DATA

Once the data collection, organization and analysis made the researcher has to draw inferences. This is possible only by the process of interpretation. It enables us for a careful, logical and critical analysis if the results obtained after analysis, keeping in view the limitations of sample chosen, the tools selected and used in the study.

Meaning

Interpretation refers to the process of drawing inferences from collected data. Generally in a research, statistical analysis of data is made. The results of statistical analysis need to be interpreted in terms of purpose of the study. The process of interpretation has two major aspects (a) to establish continuity in research through linking the results of a given study with other studies. (b) to establish relationships within the collected data. Thus interpretation is a process by which the factors that seem to explain what has been observed by research study can be better understood.

Interpretation helps the researcher to understand the abstract principles that underlines the findings. It also provides idea about the future research. It enables the researcher to appraise others research findings. So that interpretation of results is the most important aspect of a research. Therefore it should be done with much care. So the researcher should follow the following principles.

Principles of Interpretation

In order to make the interpretation effective the researcher should keep the following facts in mind.

1. The researcher must discuss whether the results support the research hypothesis and why

The researcher must discuss the results to support the research hypothesis. He should also discuss whether the results are in agreement with other findings or not. If the results are not in agreement with other studies, the reasons for such difference may be stated clearly. If the

researcher rejects a null hypothesis, then his research hypothesis may be supported but it is not proven. A supported research hypothesis does not mean that the treatment would be effective to different populations, different materials and different dependent variables.

2. Un-hypothesized results should be interpreted with great care

Very often it is found that during a study an apparent relationship may be noticed which was not hypothesized. In this case the researcher neither can change the original hypothesis nor can slip the new one. However, he can collect and analyze data on these unforeseen relationships and present his result as such. These findings may form a basis for a future study by the same researcher or other investigators.

3. The researcher must be conscious about statistical significance versus practical significance

When in data analysis we found that the results are statistically significant, it does not automatically mean that the results have educational value. The statistical significance only mean the percentage of occurrence of same result say 95% or 99%. It only indicates that the observed relationship or, difference is probably a real one. For example, in a large sample size a very low correlation may be statistically significant but may not have real practical use to any-body. Therefore researcher should keep these above facts in mind.

4. The results must have scope for replication

Replication means, if the study is done again, or repeated, the second study may be a repetition of the main study by using different subjects or it is an alternative approach to test the same hypothesis. Replication of the results provides a strong support for a research hypothesis. The need for replication is very high when an unusual or new relationship is found in a research study. It is also very much necessary when the results have practical significance and the treatment investigated might really make a difference. The significance of a relationship may be enhanced if it is replicated in a more natural setting.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. What are the benefits of data analysis?

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2. Descriptive statistics Vs. Inferential statistics

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13.7 LET US SUM UP

In this unit you have learnt the process of organization of collected data such as editing, classifying and tabulating the data. Analysis of research data, benefits of data analysis and descriptive and inferential statistics have been dealt with. You have also learnt meaning of interpretation and principles of interpretation like the researcher must discuss whether the results support the research hypothesis and why, un-hypothesized results should be interpreted with great care, the researcher must be conscious about statistical significance versus practical significance and the results must have scope for replication.

13.8 UNIT-END EXERCISES

1. How do you classify the data?
2. Write about inferential statistics.
3. What are the principles of interpretation?

13.9 ANSWER TO CHECK YOUR PROGRESS

1. Benefits of Data analysis

- ❖ Allows meaningful insights from the data set
- ❖ Highlights critical decisions from the findings
- ❖ Allows a visual view leading to faster and better decisions
- ❖ Offers better awareness regarding the habits of potential customers
- ❖ Structures the findings from survey research or other means of data collection
- ❖ Breaks a macro picture into a micro one
- ❖ Rules out human bias through proper statistical treatment.

2. Descriptive statistics Vs. Inferential statistics

- ❖ Descriptive statistics merely 'describes' research and does not allow for conclusions or predictions.
- ❖ Inferential statistics makes it possible for the researcher to arrive at a conclusion and predict changes that may occur regarding the area of concern.
- ❖ Descriptive statistics usually operate within a specific area that contains 'all' the target population.
- ❖ Inferential statistics usually takes a sample of a population especially if the population is too big to conduct research.
- ❖ Descriptive statistics is focused on summarizing the data collected from a sample. The technique produces measures of central tendency and dispersion which represent how the values of the variables are concentrated and dispersed.
- ❖ Inferential statistics generalizes the statistics obtained from a sample to the general population to which the sample belongs. The measures of the population are termed as parameters.
- ❖ Descriptive statistics make only summarization of the properties of the sample from which data were acquired, but in inferential

statistics, the measure from the sample is used to infer properties of the population.

- ❖ In inferential statistics, the parameters were obtained from a sample, but not the whole population; therefore, always some uncertainty exists compared to the real values.
- ❖ Inferential statistics starts with a hypothesis (a statement of, or a conjecture about, the relationship between two or more variables that you intend to study) and investigates whether the data are consistent with that hypothesis.

13.10 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
2. Radha Mohan (2014). Research Methods in Education. Hydrabad: Neelkamal Publications Pvt. Ltd.
3. Mahaveer Singh & Udaiveer Singh (2012). Research Methods in Education. New Delhi: University Science Press.
4. Gourang Charan Nanda & Pratap Keshari Khatoi (2012). Fundamentals of Educational Research and Statistics. New Delhi: Kalyani Publishers.
5. Ray, G.L & Sagar Mondal (2011). Research Methods in Social Sciences and Extension Education. New Delhi: Kalyani Publishers.
6. Nagarajan, K. et al (2010). Research Methodology in Education. Chennai: Ram Publishers.
7. Nakkiran, S. & Selvaraju, R. (2001). Research Methods in Social Sciences. Mumbai: Himalaya Publishing House.
8. John W.Best & James V.Kahn (2009). Research in Education tenth edition. New Delhi: Prentice-Hall of India Pvt. Ltd.

UNIT-XIV PREPARATION OF RESEARCH REPORT

Structure

14.1 INTRODUCTION

A research is not conducted for the research sake or of the satisfaction of the researcher. The study must have certain social value. So that when the research study is completed the findings must be available to all for its utilization. Therefore, the whole work done must be presented in the form of a report. The purpose of research report is to tell the readers the problem investigated, the methods used to solve the problem, the results of the investigation and the conclusions inferred from the results. The investigator's role is not to convince the reader about the virtue of the research. He is to report, as expeditiously and as clearly as possible, what has been done, why it has been done, the outcome of the study and his conclusion.

This is not an easy task. For this the researcher must strive for the right blend of detail and brevity, for objectivity and for clarity in presentation. It requires an appropriate communication in the form of a research report. Writing a good research report is possible only when the researcher possesses the knowledge of procedures, rules and principles involved in writing research report. This unit gives you an insight into writing of a research report, characteristics of good report, format of a research report and evaluation of research report.

14.2 OBJECTIVES

After going through this unit, you will be able to

- Know the purpose of research report
- Describe the characteristics of a good report
- Understand the structure of research report
- Prepare research report
- Evaluate a research report

14.3 PREPARATION AND EVALUATION OF RESEARCH REPORT

The fact that a study is completed or even published does not necessarily mean that it is a good study or that it is reported adequately. The most common flaws in studies are lack of validity and reliability, information about data-gathering procedures such as tests, observations, questionnaires, and interviews. Other common flaws include weakness in the research design, inappropriate or biased selection of participants, failure to state limitations in the research, and a general lack of description about the study. These common problems in studies reinforce the importance of being a competent consumer of research reports; they also highlight common pitfalls to be avoided in your own research.

At your current level of expertise you may not be able to evaluate every component of every study. For example, you would not be able to determine whether the appropriate degrees of freedom were used in the calculation of an analysis of covariance. There are, however, a number of basic errors or weaknesses that you should be able to detect in research studies. You should, for example, be able to identify the sources of invalidity associated with a study based on a one-group pre-test - post-test design. You should also be able to detect obvious indications of experimenter bias that may have affected qualitative or quantitative research results.

As you read a research report-either as a consumer of research keeping up with the latest findings in your professional area or as a producer of research reviewing literature related to a defined problem-you should ask yourself questions about the adequacy of a study and its components. The answers to some of these questions are more critical than the answers to others. An inadequate title is not a critical flaw; an inadequate research plan is. Some questions are difficult to answer if the study is not directly in your area of expertise. If your area of specialization is reading, for example, you are probably not in a position to judge the adequacy of a review of literature related to anxiety effects on learning. And, admittedly, the answers to some questions are more subjective than objective. Whether a good design was used is pretty clear and objective; most quantitative researchers would agree that the randomized post-test-only control group design is a good design. Whether the most appropriate design was used, given the problem under study, often involves a degree of subjective judgment. For example, the need for inclusion of a pre-test might be a debatable point, depending on the study and its design. However, despite the lack of complete agreement in some areas, evaluation of a research report is a worthwhile and important activity. Major problem and shortcomings are usually readily identifiable, and by considering a number of questions you can formulate an overall impression of the quality of the study.

The following are the lists of evaluative questions about research strategies and areas for your consideration. This list is by no means exhaustive and, as your read it, you may very well think of additional questions to ask. You will also note that not every criterion equally applies to both quantitative and qualitative research studies. The evaluative questions are given under various headings.

INTRODUCTION

Problem

- Is there a statement of the problem or a qualitative topic of study?
- Does the problem or topic indicate a particular focus of study?
- Is the problem "researchable"? That is, can it be investigated through the collection and analysis of data?
- Is background information on the problem presented?
- Is the educational significance of the problem discussed?
- Does the quantitative problem statement indicate the variables of interest and the specific relationship between those variables that were investigated?
- Does the qualitative problem statement provide a general indication of the research topic or issue?
- When necessary, are variables directly or operationally defined?
- Does the researcher have the knowledge and skill to carry out the proposed research?

Review of Related Literature

- Is the review comprehensive?
- Are all cited reference relevant to the problem under investigation?
- Are most of the sources primary (i.e., are there only a few or no secondary sources?).
- Have the references been analyzed and critiqued, and the results of various studies compared and contrasted (i.e., is the review more than a series of abstracts or annotations?).
- Is the relevancy of each reference explained?
- Is the review well organized? Does it logically flow in such a way that the references least related to the problem are discussed first and the most related reference are discussed last? Does it educate the reader about the problem or topic?
- Does the review conclude with a summary and interpretation of the literature and its implications for the problem investigated?

- Do the implications discussed form an empirical or theoretical rationale for the hypotheses that follow?
- Are reference cited completely and accurately?

Hypotheses

- Are specific questions to be answered listed or specific hypotheses to be tested stated?
- Does each hypothesis state an expected relationship or difference?
- If necessary, are variables directly or operationally defined?
- Is each hypothesis testable?

METHOD

Participants

- Are the size and major characteristics of the population studied described?
- Are the accessible and target populations described?
- If a sample was selected, is a method of selecting the sample clearly described?
- Does the method of sample selection suggest any limitations or biases in the sample? For example, is stratified sampling used to obtain sample subgroups?
- Are the size and major characteristics of the sample described?
- Does the sample size meet the suggested guideline for minimum sample size appropriate for quantitative analyses?

Instruments

- Do instruments and their administration meet guidelines for protecting participants? Have needed permissions been obtained?
- Is the rationale given for the selection of the instruments (or measurements) used?
- Is each instrument described in terms of purpose, content, validity, and reliability?
- Are the instruments appropriate for measuring the intended variables?
- Does the researcher have the needed skills or experience to construct or administer an instrument?
- Is evidence presented to indicate that the instruments are appropriate for the intended sample? For example, is the reading level of an instrument suitable for sample participants?

- If appropriate, are subtest reliabilities given?
- If an instrument was developed specifically for the study, are the procedures involved in its development and validation described?
- If an instrument was developed specifically for the study, are the administration, scoring or tabulating and interpretation procedures fully described?
- Is the correct type of instrument used for data collection (e.g., using a norm referenced instrument when a criterion-referenced one is more suitable?

Design and Procedure

- Are the design and procedures appropriate for examining the research question or testing the hypotheses of the study?
- Are the procedures described in sufficient detail to permit them to be replicated by another researcher?
- Do procedures logically relate to each other?
- Are instruments and procedures applied correctly?
- If a pilot study was conducted, are its execution and results described, as well as its effect on the subsequent study?
- Are control procedures described?
- Did the researcher discuss or account for any potentially confounding variables that he or she was unable to control?
- Is the application of the qualitative method chosen described in detail?
- Is the context of the qualitative study described in detail?

Results

- Are appropriate descriptive statistics presented?
- Was the probability level & at which the results of the rests of significance were evaluated, specified in advance of the data analyses? Was every hypothesis tested?
- If parametric tests were used, is there evidence that the researcher avoided violating the required assumptions for parametric tests?
- Are the described tests of significance appropriate, given the hypotheses and design of the study?
- Was the inductive logic used to produce results in a qualitative study made explicit?
- Are the tests of significance interpreted using the appropriate degrees of freedom?

- Are the results clearly presented?
- Are the tables and figures (if any) well organized and easy to understand?
- Are the data in each table and figure described in the text?

Discussion (Conclusions and Recommendations)

- Is each result discussed in terms of the original hypothesis or topic to which it relates?
- Is each result discussed in terms of its agreement or disagreement with previous results obtained by other researchers in other studies?
- Are generalizations consistent with the results?
- Are the possible effects of uncontrolled variables on the results discussed?
- Are theoretical and practical implications of the findings discussed?
- Are recommendations for future action made?
- Are the suggestions for future action based on practical significance or on statistical significance only (i.e., has the author avoided confusing practical and statistical significance?).

Abstract or Summary

- Is the problem restated?
- Are the number and type of participants and instruments described?
- Is the design used identified?
- Are procedures described?
- Are the major results and couclusions restated?

Type- Specific Evaluation Criteria

In addition to general criteria that can be applied to almost any study, there are additional questions that should be asked, depending on the type of research represented by the study. In other words, there are concerns that are specific to historical studies, and likewise to qualitative, descriptive, correlational, causal comparative, and experimental studies.

Qualitative Research

- Does the topic to be studied describe a general sense of the study focus?
- Is the purposive sampling procedure described and related to the study focus?
- Is each data collection strategy described?

- Is the role the researcher assumed stated (e.g., observer, participant observer, interviewer?).
- Is the research site and the researcher's entry into it described?
- Were the data collection strategies used appropriately, given the purpose of the study?
- Were strategies used to strengthen the validity and reliability of the data (e.g., triangulation)?
- Is there a description of how any unexpected ethical issues were handled?
- Were strategies that were used to minimize observer bias and observer effect described?
- Are the researcher's reactions and notes differentiated from descriptive field notes?
- Are data coding strategies described and examples of coded data given?
- Did the researcher specify the inductive logic applied to the data to produce results?
- Are conclusions supported by data (e.g., using direct quotes to illustrate points)?

Historical Research

- Were the sources of data related to the problem mostly primary?
- Was each piece of data subjected to external criticism?
- Was each piece of data subjected to internal criticism?
- Does the researcher examine the possibility of personal bias in the study analysis and conclusion?
- Are causal inferences or conclusions warranted given the data studied?
- Is the report of the study an integrated, synthesized, chronological presentation of the results?

Descriptive Research

Questionnaire Studies

- Are questionnaire validation procedures described?
- Was the questionnaire pretested?
- Are pilot study procedures and results described?
- Are directions to questionnaire respondents clear?

- Does each item in the questionnaire relate to one of the objectives of the study?
- Does each questionnaire item deal with a single concept?
- When necessary, is a point of reference given for questionnaire items?
- Are leading questions avoided in the questionnaire?
- Are there sufficient alternatives for each questionnaire item?
- Does the covering letter explain the purpose and importance of the study and given the potential responder a good reason for cooperating?
- If appropriate, is confidentiality or anonymity of responses assured in the covering letter?
- What is the percentage of returns, and how does it affect the study results?
- Are follow-up activities to increase returns described?

If the response rate was low, was any attempt made to determine any major differences between responders and non-responders?

Are data analyzed in groups or clusters rather than a series of many single variable analyses?

Interview Studies

- Were the interview procedure pretested?
- Are pilot study procedures and results described?
- Does each item in the interview guide relate to a specific objective of the study?
- When necessary, is a point of reference given in the guide for interview items?
- Are leading questions avoided in the interview guide?
- Is the language and complexity of the questions appropriate for the participants?
- Does the interview guide indicate the type and amount of prompting and probing that was permitted?
- Are the qualifications and special training of the interviewers described?
- Is the method used to record responses described?
- Did the researcher use the most reliable, unbiased method of recording responses that could have been used?

- Did the researcher specify how the responses to semi structured and unstructured items were quantized and analyzed?

Observation Studies

- Are observation variables defined?
- How were observers trained?
- Did different observers work and score independently?
- Were observers required to observe only one behaviour at a time?
- Was a coded recording instrument used?
- Are the qualifications and special training of the observers described?
- Was the level of inter-observer reliability obtained from at least two independent raters, and is the result reported?
- Is the level of inter-observer reliability sufficiently high?
- Were efforts made to overcome observer bias and observer effect?
- Was observation of participants the most appropriate approach for data collection (as opposed to use of some unobtrusive measure?).
- Was a description of how the observational data were analyzed provided?

Correlational Research

Relationship Studies

- Were variables carefully selected? That is, was a shotgun approach avoided?
- Is the rationale for variable selection described?
- Are conclusions and recommendations based on values of correlation coefficients corrected for attenuation or restriction in range?
- Do the conclusions avoid suggesting causal relationship between the variables investigated?

Prediction Studies

- Is a rationale given for selection of predictor variables?
- Is the criterion variable well defined?
- Was the resulting prediction equation validated with at least one other group?

Causal-Comparative Research

- Are the characteristics or experiences that differentiate the groups (the independent variable) clearly defined or described?
- Are critical extraneous variables identified?
- Were any control procedures applied to equate the groups on extraneous variables?
- Are causal relationship found discussed with due caution?
- Are plausible alternative hypothesis discussed?

Experimental Research

- Was an appropriate experimental design selected?
- Is a rationale for design selection given?
- Are sources of invalidity associated with the design identified and discussed?
- Is the method of group formation described?
- Was the experimental group formed in the same way as the control group?
- Were groups randomly formed and the use of existing groups avoided?
- Were treatments randomly assigned to groups?
- Were critical, extraneous variables identified?
- Were any control procedures applied to equate groups on extraneous variables?
- Were possible reactive arrangements (e.g., the Hawthorne effect) controlled for?
- Were tables clear and pertinent to the research results?
- Were the results generalized to the appropriate group?

The above discussion has given a long list questions to be asked to evaluate a research problem.

14.4 WRITING OF A RESEARCH REPORT

The thesis or dissertation writing is the final stage of a research project. It provides us with the opportunity to show that we have gained the necessary skills and knowledge in order to organise and a conduct research project. A thesis or report should demonstrate and reveal that a researcher is skilled in recognising and identifying an area or areas suitable for research; setting research objectives; locating, organising and critically analysing the relevant secondary data and authoritative and relevant

literature; devising an appropriate research methodology; analysing the primary data selected and drawing on the literature in the field; drawing conclusions and, if appropriate, making relevant recommendations and suggestion on key areas for further research.

14.4.1 Characteristics of a Good Report

The report has to possess certain characteristics and qualities, so that it can, while serving its purpose, be also recognised as a good report. A good report is expected to possess the following characteristics:

1. **Attractiveness**
   The report of study or survey should be attractive. It means that it should be neatly typed or printed on good and suitable paper. It should contain diagrams, graphs and other sketches. The title cover should be attractive and if possible contain some pictures or drawing that shall give the idea of the subject-matter of study.
2. **Balanced language**
   The language presents a difficult problem for the writer of the report. The report should be balanced and simple yet in accordance with the research or the subject of study. Technical terms should be used but they should not be so used as to make the report terse and difficult. The language of the report should be standard, technical, beautiful, simple and quite befitting the subject described.
3. **No repetition of facts**
   The report should be free from the repetition of facts. The repetition of facts, apart from adding to the bulk of report also makes the reader bored. It also makes unnecessary reading.
4. **Statement of scientific facts**
   It is necessary that the facts that are mentioned in the report, should be scientific. They should not be imaginary and utopian. The analysis and the presentation of data should be such that no question about their validity and reliability may be raised. It should not appear that the data are concocted or imaginary.
5. **Practicability**
   The data that are maintained in the report should not only be free from concoction but should also be practical. Data should be such that the conclusions that are based on them may be implemented. The suggestions that are given in the report should also be practical. If the report is not based on practical data and the conclusions that are drawn, are not practicable or suggestions that are given are not practical or practicable, the report shall have no meaning.
6. **Description of the difficulties and the shortcomings**

   A good report always mentions the difficulties and the problems that were faced during the collection of the data. It should contain not only the description about the success but also about the difficulties on the problems. If the difficulties and the shortcomings of the study are concealed, the future researchers or investigators shall not be able to overcome them and they shall also not be able to make correct findings.

14.4.2 Format of a Research Report

The format refers to the general pattern of organization and arrangement of the report. The number and types of headings and subheadings to be included in the report are determined by the format used. Several format style manuals are available, which provide guidelines to the researcher regarding presenting the research report. Most colleges and universities have developed their own style of format to be followed. But somehow the broad outlines of the format are similar to most of the style manuals.

Generally a dissertation or research report consists of three main sections, such as,

1. Preliminary Pages.
2. The Main body of the report
3. The Reference section.

1. Preliminary Pages

The preliminary pages constitute the title page, preface and acknowledgement, table of contents, list of tables and list of maps, figures or illustrations, if any. These are given below in detail:

The Title Page

The title page usually includes:

- The title of the report
- The degree requirement being fulfilled
- The author’s name.
- The name and location of the college, or university awarding the degree
- The date of submission of the report.

The title of the report “should be brief (15 words or less) and at the same time it should describe the purpose of the study as clearly as possible.” Unnecessary words must be avoided to reduce the size of the title.

The Acknowledgement

Most of the researchers devote one page towards writing acknowledgement. It permits the researcher to express his appreciation to persons who have contributed significantly to the completion of the study and writing the report. It should be brief and simple. It is acceptable to thank the guide professor or teacher, persons or institutions who have provided financial and administrative facility to complete the study.

The Table of Contents

The table of content is an outline of the report, which indicates the page on which each chapter and sub-sections of a chapter begins. It also indicates the page on which bibliography an appendix begin. The title of the chapters and subdivision of chapter in the table should exactly correspond to the headings in the body.

The List of Tables and List of Figures

A separate page is devoted for list of tables. It indicates the number and title of the table and the page on which it is located. Entries listed in the table of contents should correspond to the heading and subheadings in the main report.

The list of figures or maps must be presented on a separate page. It also indicates the number and title of the figure and the page on which it can be found. The figure titles should be identical to that are given in the main body of the report.

2. The Main Body of the Report

Generally a research report contains four major components namely

- Introduction
- Method and Design of the Study
- Analysis and Interpretation
- Summary and Conclusions

Introduction

Introduction of a research report should be simple and comprehensive. It should introduce the reader the whole problem in a summarized form. The introduction section includes a description of the problem, a review of the related literature, a statement of the hypotheses, and definition of the important terms.

A well stated problem indicates the variables and the specific relationship among these variables, which is to be investigated in a study. The statement of the problem should be backed by the justification and significance of its study.

The review of related literature indicates what has been already done in that particular field or area. It shows the areas of agreement and disagreement of results of previous studies. It is an analysis of the relationship and differences among related studies and reports.

The third aspect of the introduction is statement of hypothesis. A good hypothesis states as clearly and concisely as possible the expected relationship or difference between two variables. It also defines the

variables in operational and measurable terms. The hypothesis should be so stated that it can be tested and can be confirmed or disconfirmed.

The introduction also includes the definition of terms. These terms are defined operationally because it does not have a commonly known meaning.

Method and Design of the Study

This section of the research report includes the description about the subjects, instruments, designs, procedure, assumptions and limitations of the study. Description of subject means definition and description of the population from which the sample was drawn. It includes the size and characteristics like age, grade, socio-economic status, etc.

In this section a description about the tools used must be given. All the instruments like tests, and questionnaires, interview forms, or observation forms used to data collection should be identified and described. The function of each instrument in study must be stated. It is better to give a specimen of the instrument along with its scoring procedure.

In an experimental study the description of the design is important. It also includes the procedure of the study, the methods of the sample selection and the methods of control and treatment. This section describes each step followed in conducting the study. It should describe the time and conditions of pre-test and post-test.

Analysis and Interpretation

This is the most important section of the research report. The data should be presented in tabular forms with textual discussions. Lengthy and complex data, tables, lists should be given in appendices. The statistical procedures used for data analysis must be clearly explained. Statistical results should be presented in the form of means, standard deviations, variance, coefficient of correlation ratios, frequency distributions, graphs and charts etc. The reasons for selecting a particular test of significance, the assumptions underlying its use and the confidence levels decided to arrive at the result should be mentioned in this section. If there is any weakness in the design, tools, techniques, or population that is known must be discussed along with how and to what extent they might have influenced the findings.

The results of each statistical analysis must be discussed in terms of the original hypothesis to which it relates. It should also be discussed in terms of its agreement or disagreement with previous results obtained by other researchers. At the time of generalization, the research should avoid over generalization. In this section the researcher should discuss the theoretical and practical implications of the findings and recommendations for future research.

Summary and Conclusion

The summary section of the report includes the brief statement of the whole work done. The conclusions are presented concisely and related directly to the hypotheses that were tested. At the time of making generalizations the researcher should avoid over generalizations. For example, if in an experiment it is found that a group of eighth grade students receiving teaching through Method-1 were found to achieve significantly higher on a test of reading comprehension that a group receiving teaching through traditional method, here it would be an over generalization to conclude that Method-1 is superior method to teach eighth grade students.

3. Reference Section

The reference or bibliography section is a record of those sources and materials that have been used for the study. This section lists all the sources, alphabetically by author's last names that were directly used in writing the report. All the sources cited in the report must be included in the reference.

In this section the appendices are also given next to the bibliography. The materials that are important but not necessary to understand the report are presented as appendices. The materials like questionnaires, interview schedules, tests, documents, raw data obtained etc. can be given as appendices.

Rules for Typing

One of the most important task before the researcher is to prepare the final research report. This can be done by typing the manuscript of the research report or using a computer DTP. Whatever the means may be, the researcher has to follow certain rules in typing the research report. Most of the universities and institutions have prescribed a specific format of typing and size of the paper to be used in the report. Therefore the researcher should follow the following principles for typing or designing the research report.

Principles for Typing Research Report

There are separate style and rules for typing different sections of the research report. Therefore the typist or the data processor should know these rules and the common designs or patterns followed for making research report.

The Title Page

Generally the universities and institutions have prescribed their own format for the title page. But somewhat these are same in different aspects. The title should be typed in bold capital letters. Now a days it has become a common practice to design the title page through computer. The title should be given as an inverted pyramid without splitting the words. It

should not be underlined or kept within inverted comma. Other items of the page may be centered or balanced to the left and right margin of the page. The beginning of the words should be capital letters.

Acknowledgement Page

In this page there should be a heading ACKNOWLEDGEMENT in capital letters. Keeping a three line space the first line should start. At the end of the Acknowledgement, a space to the right side margin should be provided for the signature of the researcher. There should be three line gap between the content and signature.

Typing the Table of Contents

There should be a heading TABLE OF CONTENTS to the centers at the top of the page. After a three line space 'Chapters' is typed towards the left hand margin and 'Page' to the right hand margin. Then acknowledgement, list of tables, list of figures and chapter headings with serial numbers are typed serially. Appropriate pages are also typed as a column under the heading 'Page'. At the end of the chapters 'Appendices' and 'Bibliography' with their page numbers should be given.

'List of tables' and 'List of figures' should be given in two separate pages following the 'Table of contents'. To the top of the page at the centre the heading 'LIST OF TABLES' and 'LIST OF FIGURES' should be given. Giving a two line space to the left margin 'Table' and towards the right margin 'page' should appear. Under the heading 'Tables' the table number and exact title of the table should be given and the page on which it should be given in a column under the heading 'Pages'.

Typing the main body of the report

Typing of the research report should be done by a person with reasonable proficiency in the work or a computer DTP 'Specialist' having enough knowledge. The manuscript of the research paper should be presented systematically to the typist or DTP better. Strikeovers, crossovers, insertions and erasures are not allowed in typing the report. Now a days most of the researchers prefer computer printing because of its quality and correctness. However both typewriting and computer printing, require certain rules for typing the research report. J.W. Best and J.V.Khan has suggested the following principles for typing the main body of the report.

1. A good quality bond paper, 8.5" by 11" in size and of 13 to 16 pound weight should be used. One one side of the sheet is used in typewritten.
2. Type must be clear and black in colour.
3. There should be a margin of 1.6" in top, bottom, left and right.
4. All material should be double spaced.

5. Quotations more than three lines should be given as a special paragraph and indented five spaces from the left margin without quotation marks. The original paragraph indentations are retained.
6. Page numbers are given in parentheses at the end of a direct quotation
7. The words or letters underlined in the manuscript are to be printed in italics.

In the main body of research report one important factor is headings. Generally there are center headings, side headings and paragraph headings in addition to chapter number and chapter headings. Each chapter begins with a new page. Chapter number is given in capital letter with roman number, and placed in the Middle of the page "2" lower from the top of the page. The chapter headings should be in bold capitals in the middle of the page. Other text materials should be given three space below the chapter heading. The side headings are given in bold letters. With initial letter of the key words as a capital letter. A gap of three space above and two space below is provided of this heading. The paragraph headings indicate divisions within subdivisions. In paragraph heading only the beginning letter of the first word is capital.

Pagination

There are certain techniques of paging a research report. Each page of the report is assigned a page number. The title page is allotted a page number but it is not mentioned on it. The page numbers are placed on the top right hand corner of the page. The pages are numbered serially starting from title page through the abstract, main body of the report, references, footnotes, tables, figures up to end of appendices.

References

References are given in the text by giving the last name of the author (s) and the year of publication. In case of unpublished references, the year of reference is written. When the author's name is not cited in the text, it may be given in parentheses, separated by a comma. When the reference material is more than one line it should be given as a reverse paragraph. Following example will provide a practical knowledge of giving references.

Example

Books

One author:Kerlinger F.N (1983) Foundations of Behavioural Research, Holt, Rinehart and Winston Inc USA.

Two authors

Best J.W. and Kahn J.V., (1986) Research in Education, New Delhi, Prentice-Hall of India, Pvt.Ltd.

Three authors

Good C.V. Barr A.S. and Scates D.E., (1950), Methodology of Educational Research, New York, Appleton Centry Crofts, Inc.

More than three authors

Kelley, T.L., et al (1953), Standford Achievement Tests, New York, Harcourt Brace and World Inc.

Editied articles

Buros, O.K. (Ed) (1979), The Eighth Mental Measurement Year Book, Highland Park, NJ, Gryphon Press.

Author's name not given

Manoroma Year Book (2004) Malayala Manoroma press, Kottayam.

Journal articles and Magazine articles

Sharam A.S. and Mathew W.B., The Problems of Adolescence (Jan 2004), Journal of Educational Psychology, PP.125-126.

Thesis or dissertations (unpublished)

Khatoi P.K. (1987) A study of scholastic achievement of IX class students at different levels of personality traits and SES. Unpublished P.G. dissertations, Utkal, University, Bhubaneswar.

Government or Technical Reports

National Policy of Education (1986), Vocational Education in India, Ministry of Human Resource Development, Govt. of India, New Delhi.

Tables

Tables are presented to comprehend and interpret masses of data rapidly. "A table is a systematic method of presenting statistical data in vertical columns and horizontal rows, according to some classification of subject matter" (Best and Kahn,1986, P.327). Each table should be provided in a separate page. In top of the table the table number should be given. The column headings or box heads should be clearly labeled. The nature and units of data should be clearly described. If there are decimal points it should always be carried out to the same point i.e. up to 2nd place or 3rd place. When no data available for a particular cell, a dash should be given in that place. To indicate confidence level asterisks (*) are used.

Figures

A researcher uses different kinds of figures to make the data more interpretable and understandable. The term figure is applied to a wide variety of graphs, charts, maps, sketches, diagrams and drawings, etc. The

title of the figure should clearly describe the nature of the data presented. The figure should be simple enough to give a clear idea without much textual description. The figures follow tables in the order of items in the manuscript. The textual discussion should proceed the figure. The figures are referred by a number in the textual description. Generally the number and title of the figure is given two space below the figure.

Organization of a Research Report

The following is an ideal skeleton of a research report:

I. Introductory Section
- A. Title page
- B. Table of Contents
- C. List of Figures
- D. List of Tables

II. Main Body
- A. Problem to be investigated
  1. Purpose of the study
  2. Justification of the study
  3. Research question and hypothesis
  4. Definition of terms
- B. Background and review of related literature
- C. Procedures
  1. Description of the research design
  2. Description of the sample
  3. Description of the instrument(s) used
  4. Explanation of the procedures followed (the what, when, where, and how of the study)
  5. Discussion of internal validity
  6. Description and justification of the statistical techniques used
- D. Findings
  1. Description of findings pertinent to each of the research hypothesis of questions
- E. Summary and Conclusions
  1. Brief summary of the research question being investigated, the procedures employed, and the results obtained.
  2. Discussion of the implications of the findings - their meaning and significance
  3. Suggestions for further research

III. References (Bibliography)

IV. Appendixes

Source: Writing Research Report and proposal.
Source Book: How to design and Evaluate Research in Education "Franekal".

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Give the evaluation aspects of a problem or topic.

………………………………………………………………………
………………………………………………………………………

2. List out the characteristics of a research report.

………………………………………………………………………
………………………………………………………………………

14.5 LET US SUM UP

In this you have learnt preparation and evaluation of research report, writing of a research report, characteristics of a good report such as attractiveness, balanced language, no repetition of facts, statement of scientific facts, practicability, description of the difficulties and the shortcomings. You have also learnt format of a research report in detailed manner.

14.6 UNIT-END EXERCISES

1. State the aspects of evaluation of a research report.
2. Give the skeleton of a research report.

14.7 ANSWER TO CHECK YOUR PROGRESS

1. Evaluation aspects of a problem or topic

- Is there a statement of the problem or a qualitative topic of study? Does the problem or topic indicate a particular focus of study?
- Is the problem "researchable"? That is, can it be investigated through the collection and analysis of data?
- Is background information on the problem presented?
- Is the educational significance of the problem discussed?
- Does the quantitative problem statement indicate the variables of interest and the specific relationship between those variables that were investigated?
- Does the qualitative problem statement provide a general indication of the research topic or issue?
- When necessary, are variables directly or operationally defined?
- Does the researcher have the knowledge and skill to carry out the proposed research?

2. Characteristics of a Research Report

1. Attractiveness
2. Balanced language
3. No repetition of facts
4. Statement of scientific facts
5. Practicability
6. Description of the difficulties and the shortcomings

14.8 SUGGESTED READINGS

1. Wang Li et al (2018). Research Methods in Education. New Delhi: Sage Publications India Pvt. Ltd.
2. Radha Mohan (2014). Research Methods in Education. Hydrabad: Neelkamal Publications Pvt. Ltd.
3. Mahaveer Singh & Udaiveer Singh (2012). Research Methods in Education. New Delhi: University Science Press.
4. Gourang Charan Nanda & Pratap Keshari Khatoi (2012). Fundamentals of Educational Research and Statistics. New Delhi: Kalyani Publishers.
5. Ray, G.L & Sagar Mondal (2011). Research Methods in Social Sciences and Extension Education. New Delhi: Kalyani Publishers.
6. Nagarajan, K. et al (2010). Research Methodology in Education. Chennai: Ram Publishers.
7. Nakkiran, S. & Selvaraju, R. (2001). Research Methods in Social Sciences. Mumbai: Himalaya Publishing House.
8. John W.Best & James V.Kahn (2009). Research in Education tenth edition. New Delhi: Prentice-Hall of India Pvt. Ltd.
9. Gopal Lal Jain (1998). Research Methodology. Jaipur: Mangal Deep Publications.

DISTANCE EDUCATION

31233-M.A. (Child Care and Education) DEGREE EXAMINATION

Third Semester

RESEARCH IN CHILD STUDIES

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define – Research.
2. What is fundamental research?
3. What do you mean by review of literature?
4. Define the term hypothesis.
5. Differentiate sampling from sample.
6. What is interview?
7. What a short note on TAT?
8. Dependent Vs Independent variable.
9. What is research design?
10. Give a brief account of action research.

PART B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) What are the characteristics of research?

Or

(b) Discuss the problems of research on children.

12. (a) List out the characteristics of applied research.

Or

(b) Elucidate the sources of a research problem.

13. (a) What are the importance of review of literature?

Or

(b) Explain the types of hypothesis.

14. (a) Why does a researcher need sampling?

Or

(b) Enlist the steps for observation.

15. (a) What is questionnaire? Explain it types.

Or

(b) What are the problems in conducting longitudinal research?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the areas of research in child studies.
17. Describe the steps in developing a research proposal.
18. Explain the types of sampling techniques.
19. Explain the procedure in analysis of research data.
20. Describe the structure of a research report.